C Y C L I C A L F L U C T U A T I O N S

I N G E R M A N Y

1924 - 1929

Theodore Balderston

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ABBREVIATIONS

A.G.	Agent-General for Reparations
BA	Bundesarchiv (Federal Archives) Koblenz
BBZ	Berliner Börsen Zeitung
Centralverband... Materialien	Centralverband des deutsche Bank- und Bankiergewerbes, Materialien zur Vorbereitung der Banken-Enquete.
DBZ	Deutsche Bergwerks Zeitung
DV	Der Deutsche Volkswirt
E-A	Enquete-Ausschuss (Ausschuss zur Untersuchung der Absatz- und Erzeugungsbedingungen der deutschen Wirtschaft)
FZ	Frankfurter Zeitung
ha.	hectares
Hoffmann ...	W G Hoffmann, F Grumbach and H Hesse, Das Wachstum der deutschen Wirtschaft seit der Mitte des 19 Jahrhunderts.
IfK	Institut für Konjunkturforschung
IHZ	Industrie- und Handelszeitung
KB	G Keiser and B Benning, Kapitalbildung und Investitionen in der deutschen Volkswirtschaft 1924-28.
Konj.Stat.Hdb.	Konjunkturstatistisches Handbuch (1936)
MdW	Magazin der Wirtschaft
Rm.	Reichsmark
SSW	Siemens-Schuckert Werke
St.Jb.f.d.dt.R.	Statistisches Jahrbuch für das deutsche Reich
Stat.Reichsamt	Statistisches Reichsamt
VdESI	Verein deutscher Eisen- und Stahl Industrieller (Association of German Iron and Steel Industrialists).
VDMA	Verein Deutscher Maschinenbau Anstalten (Association of German Machine-Builders)
Vjh.Konj.forsch.	Vierteljahrshefte zur Konjunkturforschung
Vjh.Wi.fo.	Vierteljahrshefte zur Wirtschaftsforschung
Wi.u.St.	Wirtschaft und Statistik
Wd.	Wirtschaftsdienst
Wk	Die Wirtschaftskurve

LIST OF EXACT TRANSLATIONS

Advisory Council for Foreign Credits	Beratungsstelle für Auslandskredite beim Reichsfinanzministerium
Agricultural Bookkeeping Survey	Landwirtschaftliche Buchführungsergebnisse
Association of German Cities	Deutscher Städtetag
Bond of Communal Mortgage Bank	Kommunalobligation
Communal Association	Gemeindeverband
Communal Mortgage Bank	Städtischer Hypothekenbank
Commune	Gemeinde
German Railway Company	Deutsche Reichsbahn-Gesellschaft
German Savings and Clearing Association	Deutsche Sparkassen- und Giroverband
Gewerbe	Mining, Manufacturing, Trade, Commerce (plus, in Chapter 7 only, Public Utilities and Communications)
Interim Credits	Zwischenkredite
Local Authority	Used as Generic Term for Gemeinde, Gemeindeverband, Provinz
Mortgage Bond	Pfandbrief
National Association of Chambers of Commerce	Deutscher Industre- und Handelstag
Non-Profit-Making Building Trust	Gemeinnützige Wohnungsbauvereinigung
Post Office	Deutsche Reichspost
Preussenkasse	Prussian Central Co-operative Clearing House (Preußische Zentralgenossenschaftskasse).
Private Mortgage Banks	Hypotheken-Aktien Banken
Public Administration/Household	Öffentliche(r) Verwaltung/Haushalt
Public Buildings	Öffentliche(r) Gebäude/Hochbau
Public Civil Engineering	Öffentlicher Tiefbau
Public Status Credit Institution	Öffentlich-rechtliche Kreditanstalt
Reich	Die Reichsregierung
Reich Federation of German Industry	Reichsverband der deutschen Industrie
Reich Institute of Employment and Unemployment Insurance	Reichsanstalt für Arbeitsvermittlung und Arbeitslosenversicherung
States	Staaten/Länder
Work Creation Programme	Arbeitsbeschaffungsprogramm

LIST OF SYMBOLS USED IN CHAPTERS 3 AND 5

B	Balance of Payments on Current Account
BDD	Domestic Demand for German Bonds
BDF	Foreign Demand for German Bonds
Bexp	Net Export of German Bonds
BS	Supply of German Bonds
C	Private Sector Consumption at Market Prices
E	Net Accumulation of Gold and Foreign Exchange
F	Net Supply of Foreign Short Term Credits
FI	Net Factor Income from Abroad
G	Government Current Expenditure at Market Prices
I	Net Investment Public and Private Sectors at Market Prices
i	Expected Real Cost of Finance to Investor in Physical Capital
Im_c	Import of Commodities at Current Prices
Im_s	Import of Services at Current Prices
K	The Extant Physical Capital Stock
Md	The Demand for Money
Ms	The Supply of Money
NBdD	Domestic Demand for New German Bonds
NBdF	Foreign Demand for New German Bonds
NBs	Supply of New German Bonds
Po	A Policy Variable
R	The Yield on German Bonds
R_f	The Yield on Foreign Bonds
R_n	The Yield on New German Bonds
r	The German Bill Rate
r_f	The Foreign Bill Rate
S	Private Sector Saving
T_d	Direct Tax Revenues
T_i	Indirect Tax Revenues
Tr	Transfer Payments by the Government
U	A Scale which is an increasing function of the degree of Uncertainty
X_c	Exports of Commodities at Current Prices
X_s	Export of Services at Current Prices
Y	National Income at current (market) prices
Y_f	Net National Income at Factor Cost (Current Prices)
Y*	Expected Net National Income at Current (Market) Prices

ABSTRACT

The object of this thesis is to ascertain the domestic causes of the Depression in Germany, and to assess their importance. In the earlier chapters I construct a simple, static, macro-economic model capable of generating those features which distinguish the operation of the German Economy during 1924-9, from that before 1913 or after 1948. Three sources of instability in 1924-9 are highlighted: the reduced willingness to hold long-term debt; the lower propensity to save; and the persistent inflationary pressures in labour and product markets. Jointly, these explain the low prices and short maturity distribution of German financial assets, the large capital imports, the Balance of Payments deficit on current account, the apparent over-valuation of the exchange rate, and the low rate of investment. And these together explain the especial instability of the German economy at that time.

Chapters 6 to 9 consider the short-run behaviour of investment in the later 1920s. Fluctuations of inventory investment, which had been seriously destabilising during 1924-7, were less significant during 1927-9. The collapse of the domestic stock market in early 1927 had identifiable effects on the fixed investment activity of the railways, communes, and smaller-scale industry. The 'closure' of foreign capital markets after mid 1928 had however no such discernible effects. The endemically low capacity utilisation, wages pressure, and the short-run nature of much investment activity associated with expectations of lower costs of finance in the future, are more apposite explanations of the bulk of the reduction of industrial fixed investment in 1928-9.

The basic economic instability (especially the financial - affecting the public and the agricultural sectors), coupled with the export collapse, converted the recession into a crisis.

I certify that this thesis is my own work, and was composed by me

16.1.79

CHAPTER 1 INTRODUCTION

The economic history of the Weimar Republic can, in the best Caesarian tradition, be divided into three parts: the inflation (1918-23); the period of relative stability (1924-1929); and the depression (1929-33). The aim of this thesis is to explain the transition from part two to part three - the 'beginning of the depression in Germany'. I conceive this primarily as a contribution to the international economic history of the interwar years; secondarily as a contribution to the 'total' history of Weimar Germany. This being so, the appropriate organising picture seemed to me to view the German economy as a system subject to external shocks, and to ask as a basic question: was the depression in Germany the result of the impact of massive exogenous shocks on an otherwise stable system, or of the impact of milder shocks on an inherently unstable system?

Such a characterisation of the problem also narrows the choice of theoretical paradigm. I have aimed to follow the signposts provided by the broad consensus of neoclassical/neoKeynesian theory; but it is increasingly conventional among historians of modern Germany to disparage this theoretical corpus as 'bourgeois superficiality' *1. In my experience however, the proferred alternatives - be they the

*1 G D Feldman, Iron and Steel in the German Inflation, p 8;
C-D Krohn, Stabilisierung und ökonomische Interessen p 10.

menu of 'ideal types' or 'working concepts' of collectivist capitalism *2, or the menu of underconsumptionist theories *3 - are either empty, or empirically inapplicable guides to the problem in hand, despite their claims to take better account of the cyclical essence of capitalism than does the theory I follow. To engage in the relentless pursuit of 'Anglo-Saxon' economic history *4 is not thereby to devalue the political and social questions: economic analysis can be conceived of as defining the freedom of action of policy makers, the latent function of their policies *5, or the economic projections of the interaction between the classes *6. Some determinants of macroeconomic behaviour are more durable than the corresponding social/

*2 Leading candidate is 'Organised Capitalism', invented by Hilferding, resurrected recently by H-U Wehler and J Kocka, and evaluated in H-A Winkler (ed), Organisierter Kapitalismus. More modest in scope is 'collective capitalism' championed by G D Feldman (see esp. his contribution to Winkler op.cit.); 'corporative pluralism', proferred by C S Maier has a different slant (see his contribution to Winkler op.cit; also his Recasting Bourgeois Europe). The first is compared with its inferior East European cousin, State Monopoly Capitalism, in Winkler op.cit. by J Kocka.
An older variant of these theories is the Schumpeterian, rich in analysis of the socio-politico-economic interaction. See his Business Cycles Vol II pp 692 ff; also A Predöhl, Das Ende der Weltwirtschaftkrise.

*3 These are discussed immediately below pp 5 ff.

*4 H Medick, '...Organisierter Kapitalismus in Grossbritannien...' (in Winkler op.cit.)

*5 In this case, notably in relation to Reichsbank policy. See above all G Hardach, 'Reichsbankpolitik und wirtschaftliche Entwicklung...' also chs. 3 and 5 below.

*6 Eg capital and labour (pp 307 ff below) or agriculture and the rest (pp 348ff below).

political structures *7; others are contemporaneously present in economies having different social and political structures *8; but from my standpoint, more relevantly, some determinants of macro-economic behaviour are less durable than the corresponding social/political structures *8A.

To return to the picture of a system and its shocks. Three 'shocks' stand out: the cessation of the foreign credit inflow some time in 1928-29 (insofar as consequent on events in foreign financial markets) *9; the export decline from 1929 because of falling aggregate demand abroad; and lastly, Brüning's deflationary policy, as usually understood to have been dictated by foreign and domestic policy objectives rather than by economic constraints on his freedom of action *10.

*7 An aspect stressed by D Petzina, 'Die Deutsche Wirtschaft in der Zwischenkriegszeit: see pp 2-4. The basic question of continuity is posed by K Borchardt, 'Trend, Zyklus, Strukturbrüche, Zufälle ...'

*8 An aspect stressed by W Fischer, 'Die Weimarer Republik unter den weltwirtschaftlichen Bedingungen der Zwischenkriegszeit'; also D Petzina and W Abelshauser, 'Zum Problem relativer Stagnation ...'

*8A Eg The power of labour, relative to that of capital, must surely be judged greater in Germany of the 1920s than pre-war. Yet labour's share of income generated in industry and commerce surely fell up to 1923, and rose thereafter, rising fastest in 1924-25, when union strength, incidence of collective agreements etc were at their weakest. Only an 'independent' economic analysis can, I submit, account for such observations. So too for the analysis of financial markets. See pp 149ff below.

*9 The importance of this 'shock' was recently defended by M E Falkus, 'The German Business Cycle of the 1920s'.

*10 Esp. H Sanmann, 'Daten und Alternativen...'

An analysis which stresses the cruciality of these 'exogenous' precipitants of the depression presupposes a view of the operation of the economy in the 1920s. Some writers have stressed exogenous factors; the deflationary impact already in those years of the sluggish growth of world trade *11. If sluggish exports plus reparations tended to drain foreign exchange reserves, then we are on the way to an explanation of the passive Balance of Payments, the high interest rates and the foreign capital inflow. The theory can be completed by some policy hypothesis: eg an overvalued exchange rate and/or overly restrictive Reichsbank policy; the policy decisions of the '20s pave the way for the disasters of the '30s *12.

Questions immediately arise however about the stability of the implicit models. Borchardt notes that the very emphasis on capital goods which made trade such an 'engine of growth' in Germany before 1914 and after 1950, also exposed Germany acutely to the negative side of the international trade cycle *13. Similarly, in an explanation of the influx of foreign credit, one need not view the exogenously determined commodity market imbalance (plus the political disturbance of reparations) as 'primary' disorders, to accommodate which the capital balance passively adjusts; one can alternatively view as primary the

*11 See the work cited in *8; in a more comprehensive framework, I Svennilson, Growth and Stagnation in the European Economy.

*12 G Hardach: see esp. article cited in *5; also 'Zur politischen Ökonomie der Weimarer Republik'. Further W Fischer op.cit. pp 39-50; D Petzina, Die Deutsche Wirtschaft... pp 95-7.

*13 K Borchardt, 'Wachstum und Wechsellagen...' p 689. He notes also that in Germany exports have long been a 'safety valve', standing in inverse relation to domestic activity: the very dependence of Germany on exports in 1929 was a manifestation of this.

disorders of the domestic capital market (eg its 'destruction' by the inflation) which actuated the capital inflow, to accommodate which the current account balance adjusted *14.

Finally, a question, I believe not yet properly considered: was it merely political goals and constraints that shunted Brüning on to the most deflationary policy of all western industrial countries?

The writers cited up to now mostly focus on stability problems of the external balance; another group focusses on the internal balance. Underconsumptionism is popular with these. Underlying Krohn's recent study *15 is a Hobson/Luxemburg version: excessive capital accumulation during the inflation generated a level of output which could not be 'realised' after the stabilisation, given the distribution of income. Government fiscal policy reinforced this failure. Kroll *16, starting, (it seems) from the axiom that capitalists desire money profits to hold, shows that deflationary leakages from the flow of income are inherent in capitalism, and effective if not offset by exogenous expenditure (eg credit-financed investment, public works).

*14 Borchardt, 'Wachstum...' p 705; Petzina (Die Deutsche Wirtschaft... pp 95-7) opts for a combination of commodity market and capital market disorders, plus restrictive monetary policy.

*15 C-D Krohn op.cit. esp. pp. 223-5, 54-60, 100-105, 128, 137-41, 173, 195, 210. The vital feature - the investment function which failed, after stabilisation, to generate adequate demand for capital goods - is not specified; nor is the other particular assumption spelled out or verified: that the marginal propensity of capitalists to save exceeds that of workers.

*16 G Kroll, Von der Weltwirtschaftskrise zur Staatskonjunktur pp 314-327, 352-60. This work remains the most detailed account of the depression in Germany.

When conjoined with the hypothesis of a rising profits' share in the later 'twenties, we get an explanation of the extreme severity of the depression *17.

All underconsumptionist explanations of the German depression suffer however from the severe objection that, as far as can be ascertained, labour's share of income generated in the private sector rose in the period 1927-9 *18.

J Kuczynski offers an empirically based overproduction theory, based on the contradictions implied by the increases in the output, prices and inventories of producer goods, relative to consumer goods, the severity of the contraction being a result of the stage of 'state monopoly capitalism' reached *19.

Of the writers focussing on the internal balance, all propose models marked by instability, except P Temin, who offers a neo-Keynesian

*17 P C Martin, Die deutsche Wirtschaftsentwicklung vor der Weltwirtschaftskrise...
The role of credit creation is also stressed by W Ehrlicher, Geldkapitalbildung und Realkapitalbildung (esp. pp 13-80). He juxtaposes realised investment and realised credit expansion (neglecting prices and interest rates) to evolve a theory by which he predicts a more severe recession in 1950s than that of the 1920s.
In addition to the above, the role of excess capacity in the later 1920s, created by the 'rationalisation boom' is stressed by eg K E Born, Die deutsche Bankenkrise pp 34-5, K W Hardach, Germany 1920-1970 pp 195-6; Petzina/Abelshauser op.cit. pp 62-3; G Hardach, 'Zur politischen Ökonomie...' pp 22-5, and others.

*18 For data see below pp 152 ; also W G Hoffmann, F Grumbach, H Hesse, Das Wachstum der deutschen Wirtschaft... p 508. For comment see K Borchardt, 'Wachstum... p 690, 705.

*19 J Kuczynski, Studien zur Geschichte der Zyklischen Uberproduktionskrisen in Deutschland 1925-45, pp 103-15.

inventory cycle model, presumably implying that per se the economic structure was stable *20.

A last important class, difficult to fit into this classification, is composed of theories which explain the depression by means of the increasing price and output rigidity which cartels and trusts imparted to the economy *21.

To evaluate all these views would require unobtainable space. Instead I will seek in the next four chapters to assess the stability of the macro-economic structure by developing a simple neo-Keynesian model which is capable of explaining the characteristic differences of the German economy in three periods: 1899-1913; 1924-1929; and 1950-1955 (ie after a second inflation) *22. I select the following differences

*20 P Temin, 'The Beginnings of the Depression in Germany', esp. pp 246 ff. I assume that his model implies a stable economic structure, because most modern theories of inventory investment would imply such; having modified the consumption function and the rigid orders and production lags which rendered instability plausible in Metzler's model. For literature: L Metzler, 'The Nature and Stability of Inventory Cycles', M Lovell, 'Sales Anticipations...', esp. pp 576-9, M Evans, Macroeconomic Activity, pp 201 ff.
A further thrust of Temin's article is his rejection of financial factors as explanations of the German depression. D Keese, 'Die volkswirtschaftliche Gesamtgrössen...' provides the data for a Keynesian analysis, especially of the internal balance, but without clear enough specification, especially of his investment function, to assess the stability properties of his system.

*21 D Petzina, 'Germany and the Great Depression' esp. pp 60-1, also his Die deutsche Wirtschaft... p 17; P C Martin op.cit. pp 16-30, who also offers an attempted verification.

*22 Only G Hardach (*12) and P Temin (*20) have hitherto tried to develop complete (if, like that offered here, simple) models of the economy 1924-29; and they did not try to relate them to the features of the pre-First and post-Second World War Economy. And in a later work (Weltmarktorientierung... p 159) Hardach eschews counterfactuals.

for explanation:

A. The higher average rate of unemployment of labour and capital *23 during 1924-29 than before 1913 or after 1953. Estimates of unemployment differ. Most derive from Galenson and Zellner's (adjusted) estimates of unemployed trade-unionists *24. See Table 1 below.

Table 1 Unemployment in Germany

a. As % of Trade Union Membership (1904-13, adjusted)				b. As % of Entire Labour Force	
1904	3.6	1913	4.2	1913	1.3
1905	3.0				
1906	2.7	1920	3.8	1920	1.7
1907	2.9	1921	2.8	1921	1.2
1908	4.4	1922	1.5	1922	0.7
1909	4.3	1923	10.2	1923	4.5
1910	3.5	1924	13.1	1924	5.8
1911	3.1	1925	6.8	1925	3.0
1912	3.2	1926	18.0	1926	8.0
		1927	8.6	1927	3.9
		1928	8.6	1928	3.8
		1929	13.3	1929	5.9

c. Phelps Brown/Browne % of Entire Labour Force	
1913	1.2
1925	3.5
1926	10.0
1927	4.7
1928	5.8
1929	7.3

1950	7.2
1951	6.4
1952	6.1
1953	5.5
1954	5.2
1955	3.8

NOTES a. and b. have same numerators but different denominators as stated, and described in sources. c. spliced T.U. unemployment data to absolute numbers reported unemployed in 1929; thus obtaining a higher numerator to divide by approx. the same denominator as in b.

SOURCES: a. W Galenson and A Zellner, International Comparisons ... p 455; b. A Maddison, Economic Growth in the West, pp 216-220; c. E H P Brown and M Browne, A Century of Pay, pp 381-2.

*23 For detailed evaluation of capital stock utilisation data see pp 253ff below.

*24 W Galenson and A Zellner, International Comparisons of Unemployment Rates, pp 455, 459, 526-37. They increased the pre-1913 estimates, mainly to allow for the seasonal unemployment of ununionised labour.

I suppose Phelps Brown and Browne's data are the most accurate, but only Galenson/Zellner and Maddison permit of long-period, and international comparison.

B. The low investment ratio in 1925-29, by comparison with the other two periods. *25

C. The Balance of Payments surplus on current account before 1913 and after 1950, but deficit (on average) 1924-29, plus the implied capital flows and their maturities *26.

D. The relative rate of wage and price increase: equal to or less than that abroad in the first and last periods; greater in 1924-29 *27.

E. The much higher interest rates and bond yields, relative to abroad, in the middle period than before 1913. The post-1950 short rates were below those of 1924-29; long rates were administered *28.

F. The much lower level of private sector saving in the middle period than either the first or the last *29.

G. The much severer cyclical experience of the economy during 1925-29 (and 1929-33!) than in either other period. This point holds even when corrected for international comparisons *30.

*25 See pp 135 below

*26 See pp 131 below

*27 See pp152,162below

*28 See pp 55,67 below

*29 See pp 135 below

*30 Except, possibly, in the case of a comparison with the U.S.A.

Point G leads over to the second stage of the thesis. Prompted by the focus of Keynesian analysis, by the predilections of students of the internal balance, and by the data (Table 2 p 11), I examine, in chapters 6 to 9, investment activity, disaggregated by major classes, in an attempt to obtain an explanation, within the framework already developed, of the actual cyclical history of the period. It will be as well to establish this history at the outset. Mainly following Schmidt *31, we can periodise the turning points from January 1924 as follows: To April 1924 there was a brief recovery, which in that month was abruptly reversed into a recession lasting until June. From about September recovery resumed till some time in 1925. Schmidt dates the turning point at March/April 1925; in fact equity prices, and industrial production peaked in February, but a definite recession did not get under way till the end of the year. When it came, it was precipitous. A lower turning point was reached (according to Schmidt) in March/April 1926. The lively upswing which ensued petered out in late 1927; the actual turning point is imprecise. Schmidt gives March/April 1928. But the important thing to note is that a domestic investment recession (æmarked eg by a decline in domestic machinery orders *32 and slackened pace of inventory investment *33) can be detected from late 1927 or early 1928. But this was offset by an export boom. Only when this gave way in later 1929 did domestic economic activity collapse.

*31 C T Schmidt, German Business Cycles 1924-33, pp 129-31.

*32 See p 247 below.

*33 See p 230 below.

Table 2 summarises the annual value of the major national accounting variables in the period.

Table 2a Components of NNP 1925-30 Current Prices Mrd.Rm.

	1925	1926	1927	1928	1929	1930
NNP	67.3	65.5	80.5	84.0	79.5	71.9
Government Consumption	7.9	8.2	8.8	9.9	9.9	9.7
Commodity Exports	9.6	10.7	11.1	12.6	13.6	12.2
Net Investment***	8.1	4.5	11.3	10.3	6.2	1.7
of which:						
Inventory Investment **	2.3	-1.7	3.4	2.0	-1.0	-3.3
Fixed:Industry/Commerce**	2.8	2.3	3.1	3.5	2.7	1.6
Public; Railways	1.1	1.4	1.8	1.8	1.7	1.4
Housebuilding*	1.7	2.2	2.6	2.7	2.5	1.7
Agric: Fixed*	0.3	0.3	0.4	0.4	0.4	0.4
Fiscal Surplus (+)****		-0.7	-1.3	-0.4	-0.9	-1.5
Balance of Payments	-2.0	+1.1	-2.7	-1.2	-0.1	+1.1

Table 2b Components of NNP 1925-30 Constant (1913) Prices Mrd.M.

NNP	47.2	47.2	52.8	54.2	52.0	48.8
Output of Industry/ Commerce**	29.7	27.8	34.1	34.5	35.3	31.2
Exports	6.7	7.7	7.8	8.6	9.9	9.3
Net Investment***	5.3	4.3	6.9	6.6	4.3	1.5
of which:						
Inventory Investment**	1.5	0.1	1.8	1.4	0.0	-1.6
Fixed:Industry/Commerce**	1.9	1.6	2.1	2.3	1.7	1.0
Public; Railways	0.7	0.9	1.1	1.1	1.0	0.9
Housebuilding*	1.0	1.4	1.5	1.5	1.4	1.0
Agric: Fixed*	0.2	0.3	0.3	0.3	0.3	0.2

* Hoffmann publishes estimates of <u>non-agricultural</u> housebuilding. He states however that 50% of his estimates of investment in agricultural buildings is composed of housebuilding in that sector. In these Tables this element has been subtracted from 'Agricultural Fixed Investment' and added to other housebuilding to obtain aggregate estimates of housebuilding investment.

** ie mining, manufacturing, transport, trade and commerce.

*** excluding investment in crops and livestock.

**** The Fiscal Year ran from 1.4 to 31.3

SOURCES: for Table 2a, except line 'Fiscal Surplus', and 2b, except lines 'NNP', 'Net Investment', and 'Inventory Investment': Hoffmann... pp 236, 237, 246, 247, 260, 455, 818, 826, 828.

2a, 'Fiscal Surplus': Table 2 p 91 below.

2b, 'Inventory Investment' 1925-6: Table 1d, line '2HD', p214 below. 1927-9: Table 2, line '2HD', p 215 below.

2b, 'Net Investment', 'NNP': Hoffmann's estimates of these were adjusted by the substitution of my revised estimates of constant price inventory investment.

CHAPTER 2 FINANCIAL MARKETS AND MONETARY POLICY - DESCRIPTION

2.1. Introduction: The Structure of Financial Markets

2.1.1. There are two reasons for placing this chapter so early. Firstly, in an economy which has just emerged from the chaos of hyperinflation, and in whose external balance financial transfers were so significant, intuition suggests that analysis of the financial sector might provide a key to the understanding of its operation. Secondly, in Weimar Germany, as elsewhere at the time, macro-economic policy was, in effect, monetary policy. A good number of studies of monetary policy have been published *1, but the broader analysis of financial markets has received less attention.
In this chapter and the next, I wish to confine attention as far as possible to monetary and financial variables. In this chapter three financial markets are discussed. Firstly, the market in short-term 'money market' debt and commercial bills. Secondly, the market in long-term bonds and equity. Thirdly, the market in bank credit. The changing conditions in these markets, and in the relationships between them, is analysed especially with respect to the after-effects of the

*1 Especially Salomon W Flink, The Reichsbank and Economic Germany (1929); K R Bopp, Die Politik der Reichsbank seit der Stabilisierung (Weltwirtschaftliches Archiv 42/2 (1935); R Stucken, Deutsche Geld- und Kreditpolitik 1914-63 (1963 1st ed. 1937; M B Northrop, Control Policies of the Reichsbank (1938; G Hardach, Weltmarktorientierung und relative Stagnation (1976). More political than economic is H Muller, 'Die Reichsbank eine Nebenregierung ...'(1973).

inflation, the impact of monetary policy, and to the interaction with the external trade balance and with foreign financial markets. Then, in the third chapter I develop a simple analytical model of the interrelationships between these markets, to test a hypothesis of the after-effects of the inflation upon willingness to hold different classes of debt. In the fifth chapter this financial model is built into a general model of the comparative statics of the macro-economy.

2.1.2. In Germany in the period under review the manufacture of money was effected by *2

i) the Reichsbank, as the central bank, ie the note-issuing bank, and bankers' bank to the financial system. Four other note-issuing banks were too small to matter in this context. The bank issued money a) by buying gold and foreign exchange (including foreign bills close to maturity) at a fixed price, and b) by discounting 'eligible' domestic paper of (after September 1924) less than three months maturity. In practice 'eligibility' was defined rather strictly, not only with respect to the bill itself, but also to the status and solidity of the discounter *3. Finally c) the Reichsbank also lent against eligible collateral (Lombardkredit), but the securities, bills etc which it gained through its lombard business were, unlike the assets obtained

*2 An estimate of the total money stock in 1929 is given by J Marschak and W Lederer, 'Grössenordnungen des deutschen Geldsystems', p 391. This should be read in conjunction with Northrop op.cit. p 45, where estimates of the turnover of giral balances are provided.

*3 G Hardach, Weltmarktorientierung ... p 153.

via transactions a) and b), not available as reserves to 'back' the currency issue *4.

Despite its near monopoly of the currency issue, the Reichsbank's control of the money supply was vitiated by the fact that in two senses it was not fully banker to the government.

Firstly, its credit business with the Reich was limited, after its reconstruction in 1924, to the extension of a 100 mill.Rm. overdraft (Kontokorrentkredit). Not till 1926 was the Reichsbank law amended to enable it to rediscount up to 400 mill.Rm. of Reich treasury bills of less than three months maturity (and actually, such bills were not issued till 1928). Initially there was no provision for holding longer term government securities; not until 1933 was government stock of above one year maturity admitted as eligible collateral for 'lombard credit'. During the period 1924-29 it may be said that the Reichsbank was not equipped for the conduct of open-market operations in long term stock *5. Secondly, the Reichsbank was not the sole depositary of government funds, and was further disadvantaged by its statutory inability to pay interest on such deppsits. Hence large quantities of public moneys were also deposited with the Prussian State Bank (Seehandlung), with the 'concern' banks of public enterprises, such as the Reichskreditgesellschaft (banker to Reich industrial enterprises) or the Deutsche Verkehrsbank (railway bank), or with other banks. Even departments of the Reich did not necessarily bank with

*4 Currency in circulation had to be backed to 40% by gold and foreign exchange; the residual (to 100%) by 'eligible' domestic bills. A tax was payable if the 40% limit was breached. Northrop op.cit. p 32; R Stucken op.cit. pp 65-6.

*5 Northrop op.cit. pp 35ff, 56, 147; Bopp op.cit. p 476.

the Reichsbank *6. This circumscribed its control of the money market. Thus both in respect of long and short term debt, the fact that the Reichsbank (largely as a consequence of the inflation) was not fully banker to the government impaired its control of the financial markets.

ii) In the 'second line' of money creation may be placed the balances in the giro accounts which handled the bulk of non-cash transfers. The Reichsbank itself was of major importance in this field. Giral balances with it were held not only by the commercial banks to facilitate inter-bank clearances, but also by a large number of firms, by government departments and a few individuals. Giral business was also conducted by the Post Office and by the Giral Clearing Associations (Giroverbände) of local savings banks and of producers' (and some consumers') co-operatives. There was lastly a certain amount of direct clearance between commercial banks, of cheques drawn on their 'sight' deposits (täglich fällige Guthaben), but this seems to have been still relatively underdeveloped *7.

iii) In the 'third line' of money creation stood the deposits with the commercial (ie the Privatkredit-) banks - that is, deposits at between 7 days and three months notice, - and deposits in Post Office savings accounts. As rather liquid assets these functioned as 'near moneys'.

*6 See J Popitz, Die Kapitalwirtschaft der 'öffentlichen Hand', pp 233-9; As evidence of the competition of the 'Seehandlung' to attract public deposits, see the article by its President, F Schröder, 'Der Ausgleich auf dem Geldmarkt', in Bankarchiv XXVI (1926/7).

*7 Northrop op.cit. pp 42-8, 158-9. J J Klein, 'German Money and Prices' pp 133-6.

Finally, it should be said that commercial and savings banks were subject to no official reserve ratios *8.

It is convenient to summarise at this point the other classes of debt which made up the financial structure *9. Starting at the most liquid end we have the daily and monthly money (Tages und Monatsgeld) lent by banks to each other or to third parties, usually in connection with transactions on the stock or commodities markets. Forward transactions on the stock market could be prolonged by a device of bank lending called 'Report credit'. Closely related to this was the market in bills (Privatdiskont, or the market in bankgirierte Warenwechsel). When the lending was against securities, it was lombard business; and as this was usually associated with stock market transactions, bank credit under the head of Reports and Lombards is usually considered an indicator of bank lending to the stock market *10.

So much for what might be termed 'debt pertaining to the 'formal' money market'. A second, much less liquid, class of debt was that created by customer borrowing from banks; eg the well-known Kontokorrentkredit. This was a field of fierce competition. The Berlin great banks competed with each other for the large scale credits to 'big' business and commerce; the needs of small business,

*8 Bopp op.cit. p 447.

*9 On this see W Prion, 'Organisation des deutschen Kapitalmarktes und der deutschen Bankwirtschaft'; F Döring, 'Kreditmärkte und Zinssätze seit der Stabilisierung;' Northrop op.cit. pp 70-162.

*10 A considerable proportion of bank overdrafts was also related to stock market business, but these cannot be isolated.

formerly met by a mass of private and local bankers, were now increasingly competed for by public sector (eg municipal and savings) banks *11. Export credits were a field of competition between the great banks, certain private banks and, in this period, foreign banks.

To conclude this rapid review of the financial structure, I consider long term securities. This market had suffered grievously from the obliteration of its stock in the inflation, a condition hardly remedied by the legislative revaluation of debt in July 1925 *12. The basis of the long term securities market is usually the debt of the central government; in this period the revalued pre-1924 Reich debt (which was subject to peculiar conditions), and the small amount of post-1924 Reich debt, could not serve this purpose. Then there came the bonds of the states and the multifarious local authorities, the stock of which was growing at a faster rate *13. Perhaps as antique and as solid in the German financial structure are the mortgage bonds (Pfandbriefe), ie the bonds secured against loans on agricultural, residential and, more rarely, industrial property. In the 1920s the 'best' mortgage bonds were issued by a class of private (Hypotheken-Aktien-) or public (Kommunal-) credit institutions.

*11 See W Prion, article cit. *9; E-A V/2 Die Bankkredite, pp 155-162; Northrop op.cit. pp 90-95.

*12 See p 123 below for details.

*13 From Hoffmann ... p 790 it appears that the nominal value of the total stock of government debt (all levels) in 1913 was 27 mrd.Rm.; in 1929 it was 12 mrd.Rm. of which 3.2 mrd.Rm. had been issued abroad.

The last major type of long term security was the equity and bonds of industrial/commercial companies. Equity was of course less affected by the inflation, but the value of the domestic stock of industrial/commercial bonds was in 1929 still only c. 40% of that in 1913 *14. The major holders of long term securities were (not in order of importance), the private rentier, private savings institutions such as savings banks and insurance companies, and the state-run social insurance schemes. Commercial banks acted as issuing houses for all classes of long term security (except mortgage bonds) but preferred not to hold more than small quantities on their own account as 'permanent' assets *15.

2.2. The Cyclical Development of Financial Markets: Data

In this section I assemble data on short term interest rates, domestic and foreign bond prices, equity prices, domestic and foreign new issues, and short term capital flows. These are to be referred to when reading

*14 Hoffmann... p 785 (Obligationen der Aktiengesellschaften). The 1929 figure must be multiplied by 0.3 since c.70% of the total stock as of 31.12.29 had been issued abroad. Cf. Wi.u.Stat. 1930 p 386. The total nominal value of equity (of which almost all was issued at home) was in 1929 c.180% of the 1913 value. Hoffmann ... loc.cit.

*15 W Hagemann, Das Verhältnis der Grossbanken zur Industrie, pp 63-73; G Bernhard, 'Die Liquiditätsstörungen und die Krise des deutschen Bankensystems, passim; E Wolfgang, 'Kritische Darstellung der Kreditbeschaffungstechnik der öffentlichen Körperschaften', pp 793-806 (on public sector).

the following narrative section.

Table 1 Short Term Interest Rates

1a Changes in Reichsbank Discount Rate

1.1.24	10%	7.5.26	6½%	11.10.27	7%
26.2.25	9%	6.7.26	6%	12. 1.29	6½%
12.1.26	8%	11.1.27	5%	25. 4.29	7½%
27.2.27	7%	10.5.27	6%	2.11.29	7%

1b Annual Averages of Reichsbank discount, and Market Rates

	1924	1925	1926	1927	1928	1929
Daily Money	28.2	9.1	5.3	6.1	6.7	7.8
Monthly Money	25.2	10.8	6.6	7.8	8.2	9.0
Bill Rates 'Privatdiskont'		7.6	4.9	5.5	6.5	6.9
Bill Rates 'bankgirierte Warenwechsel'		9.0	5.8	5.8	6.9	7.3
Reichsbank discount	10.0	9.2	6.7	5.8	7.0	7.1

1c Quarterly Averages of the Four Market Rates* in 1b

First Quarter	27.0	9.6	6.7	5.1	6.9	6.5
Second Quarter	40.5	9.0	5.1	6.0	7.1	8.1
Third Quarter	19.5	9.1	5.2	6.7	7.2	8.0
Fourth Quarter	13.6	8.7	5.5	7.4	7.2	8.0
Annual Average	25.2	9.1	5.7	6.3	7.1	7.7

* Monthly Money only in 1924

Sources to TABLE 1a: Konj.Stat.Hdb.(1936) p 109.

1b: 1924: Statistisches Jahrbuch f.d. deutsche Reich 1926 p 339.

1925: Konj.Stat.Hdb.(1936) pp 112-3.

TABLE 2 BOND AND EQUITY PRICES

2a Quarterly Average Price of 8% Gold Mortgage Bonds

	1924	1925	1926	1927	1928	1929
1st Quarter	-	88.1	89.5	103.2	98.0	95.4
2nd Quarter	-	85.3	98.2	102.3	97.3	94.2
3rd Quarter	86.4	82.9	98.9	100.5	97.0	93.4
4th Quarter	85.1	82.2	100.0	98.4	96.6	92.2

2b Bond Prices in New York (Index: 1927=100) Quarterly

i) Moody's Aaa US Bonds ii) 1st Class German New York Bonds

	1927	1928	1929	1927	1928	1929
1st Qu.	98.3	102.5	98.1	100.5	99.3	97.8
2nd Qu.	99.8	101.4	96.8	100.5	99.5	96.5
3rd Qu.	100.1	98.9	95.4	100.0	98.7	96.7
4th Qu.	101.8	99.3	97.0	98.9	98.2	95.4

2c Domestic Share Price Index

	1924	1925	1926	1927	1928	1929
1st Quarter		120	82	168	145	143
2nd Quarter		99	97	168	152	138
3rd Quarter		82	117	157	149	134
4th Quarter		72	140	140	148	120

Sources to TABLE 2:

a) Stat.Jb.f.d.Dt.R. 1926 p 337, 1927 pp 372-3, 1928 pp 438-9; E Wolfgang, Die Kursbildung... p 91.

bi) C C Abbott, The New York Bond Market, pp 167-8 (inverse of yields adjusted to 1927=100).

bii) Wk 6(1927) p 392; 7(1928) pp 35,327; 8(1929) pp 107,435; 9(1930) p 107.

c) Konj.Stat.Hdb. (1936) p 115.

TABLE 3 QUARTERLY NEW ISSUE STATISTICS

3a New Issues of Equity on the Domestic Market (Nominal Value excl. Mergers) Mill.Rm.

	1924	1925	1926	1927	1928	1929
1st Quarter		219	99	379	201	357
2nd Quarter		142	120	432	412	338
3rd Quarter		151	305	248	324	165
4th Quarter		149	374	310	385	104
Annual Average	588	656	988	1438	1339	979

3b New Bond Issues on the Domestic Market Mill.Rm.

1st Quarter		338	436	1432	984	582
2nd Quarter		346	918	702	881	362
3rd Quarter		159	825	362	497	386
4th Quarter		187	1034	358	543	223
Annual Total	440	1080	3579	2854	2905	1553

3c German Bond Issues on Foreign Capital Markets Mill.Rm.

1st Quarter	287	324	85	342	235
2nd Quarter	54	450	89	735	75
3rd Quarter	307	346	670	114	8
4th Quarter	671	397	565	273	33
Annual Total	1265	1555	1412	1465	349

3d German Public Authority Issues Abroad Mill.Rm.

	1927	1928	1929
1st Qu.	-	2	17
2nd Qu.	-	95	-
3rd Qu.	103	24	-
4th Qu.	150	62	15

3e Aggregate Foreign Govt. Bond Issues in New York Mill.Rm.(for comparison)

	1927	1928	1929
	886	1189	151
	836	920	25
	580	357	97
	1604	273	17

SOURCES to TABLE 3: All sections excppt 3c (1925-26) and 3e:
Stat.Jb.f.d.Dt.R. 1927 p 389; 1928 p 433; 1929 p 315; 1930 p 369.
3c: 1925-26 data - Wk 6(1927) p 384.
3e: C C Abbot op.cit. pp 200-202.

TABLE 4 QUARTERLY INFLOW OF SHORT TERM CAPITAL Mill.Rm.

	1924	1925	1926	1927	1928	1929
1st Quarter		905	-491	333	819	143
2nd Quarter		491	-788	1066	445	-
3rd Quarter		497	347	698	812	-
4th Quarter		47	366	802	1103	-
Annual Total	1112	1937	-566	2899	3179	-

SOURCE TO TABLE 4: Vjh.Konj.forsch. 1929 H1A p 38. The data is related to the Balance of Payments residual.

2.3. The Cyclical Development of Financial Markets 1924-29
Description

It is a well-established generalisation that the demand for real money balances falls as the expected rate of price inflation rises *16. When therefore inflationary expectations collapsed as the Reichsbank ceased its discounting of paper mark Treasury Bills in November 1923, and succeeded in holding its exchange rate steady in the face of bear speculation, the existing stock of money proved totally inadequate, at the emerging price level, to meet the revised demand *17. This excess demand for money manifested itself in a huge excess supply of

*16 P Cagan, 'The Monetary Dynamics of Hyperinflation'; A D Bain, The Control of the Money Supply, pp 104-5.

*17 Currency (Renten- and Billmark) plus emergency cash (Notgeld) were estimated at c. 2.5 mrd. gold mark in December 1923, as against 6.9 mrd.M. in 1913 (when the price level had been lower. Cf. Hardach, Weltmarktorientierung ... p 31; also Flink op.cit. pp 88-93.

other debt: daily and monthly money rates jumped to several hundred percent; longer term debt could not be sold. To be sure, this incorporated a large inflation risk premium, but even when general indexing of loans (Entwertungsklausel) was introduced in early 1924, daily and monthly money rates remained at c.2% per month *18. The high rates offered by banks for deposits and the abnormally large gap between bank lending and borrowing rates, coupled with bank reluctance to lend except to clients of known reputation, presumably betrays their avid attempts to rebuild cash balances, as well as their high subjective discounting of business risks *19. The Reichsbank had however pegged its discount rate at 10%, so that discount business was extremely brisk in the first few months of 1924; in consequence notes and coin in circulation increased by nearly 25% by the end of March *20.
The price of commodity and gold mark bonds rose steeply in the uncertain period between November and the end of 1923, but thereafter, as an expression of the general excess supply, fell steeply. Equity prices behaved similarly. New issue markets for all long term debt and equity were practically closed *21. During this time demand for

*18 Wk 3(1924) pp 74-5, 155; Wd 10/1 (1925) pp 207, 247, 'Der Geld und Kapitalmarkt im Jahre 1924'. The indexing of loans against inflation ceased with the introduction of the Reichsmark in October 1924.

*19 See Table 5 p 32 . Wd 9/1(1924) pp 221ff, 'Starres oder elastisches System?'; Wk 3(1924) pp 281-3; F Müller, Die Reichsbank ... in Untersuchung des Bankwesens I Vol 2 pp 202-3. See too pp 46-7 below.

*20 Wk 3(1924) pp 86ff; Hardach, Weltmarktorientierung ... p 31.

*21 Wd 10/1(1925) pp 207-9, 'Die Geld- und Kapitalmärkte im Jahre 1924'; Wk 3(1924) pp 66ff, 149ff. In May 1924 the current yield (coupon value divided by price) on good bonds was 14% - ibid. p 155. (True yield were much higher, since bond prices were below parity).

foreign exchange was so heavy, owing largely to the deteriorating Balance of Payments, and reserves so small, that the Reichsbank could only provide a small percentage of the quantities of foreign exchange demanded *22. In consequence of this, and of signs of renewed price rise within Germany, the 'Billmark' sank below parity in February and again in early April. Schacht decided on a stern remedy: "a rest cure for the currency coupled with a hunger cure for the economy" *23, and on 7.4.24 he announced a 'Kreditstopp'. Reichsbank holdings of discounted and lombarded paper were to be frozen at current levels, and within this total gradually to be redistributed in a desirable manner (above all in the interests of exports and agriculture). *24. The price of daily money shot up temporarily to 50% and the bankruptcy rate soared, but the mark recovered quickly in foreign markets, the Balance of Payments improved dramatically, and the domestic price level fell *25. In the long term perhaps the most serious aspect of the 'Stopp' was that it signalised the abandonment by the Reichsbank of its hitherto unfailing commitment to act as lender of the last resort, thus nullifying the traditional (low) cash ratio policies of

*22 Wd 10/1(1925) pp 9ff, 'Ein Jahr fester Währung': Wk 3(1924) pp 41. Cf.Hardach, Weltmarktorientierung ... pp 33. Buoyant foreign expectations had otherwise prevented a slippage: Wd 9/1 (1924) p 169, 'Der Markkurs und der Spekulation'; Wk 3(1924) p 109.

*23 Wd 9/1(1924), 'Starres oder elastisches System?' Already in Feb. rediscount facilities of banks trying to evade exchange controls had been suspended: F Müller, article cit. *19 p 200. H Müller, Die Zentralbank ... p 55 makes heavy weather of the fact that the banks long term aim was to accumulate enough reserves to enable convertibility.

*24 Wk 3(1924) p 153; Wd 10/1(1925) pp 9ff (see *22); pp 207-209 (see *21). F Müller loc.cit. *23; also the studies in *1, especially Hardach pp 51ff.

*25 Wk 3(1924) pp 212, 214, 280ff, 387ff, 425.

the commercial banks *26.

The renewed fall in bond and equity prices is probably also partly related to the 'Stopp', but the effects in this market were less dramatic. Short term interest rates remained high until June, and at the same time, aided perhaps by a support initiative of the banks, share prices seemed to bottom out. From then on till the end of the year interest rates fell and bank lending conditions eased (see Table 5 p 2/20). Improved confidence in the currency is reflected in the reduced gap between interest rates on indexed and non-indexed loans *27. In September the Reichsbank relaxed its credit quota by 10% and increased the allowable maturity of eligible bills from six/eight weeks to three months *28. But this was not the major reason for the easing of financial conditions. Of great significance was the incipient inflow of foreign funds, signalised by the ability of the Reichsbank to abolish its foreign exchange quotas from June 1924. Initially this was a consequence of the improved Balance of Payments; from September, when the external balance again began to deteriorate, it must reflect a considerable inflow of short term funds in response to interest rate differentials; this was the impression of contemporaries *29.

*26 Wk 3(1924) pp 213,281; Wd 9/1(1924) pp 384ff, 'Reichsbank und Kreditinstitute'; R E Lüke, Von der Stabilisierung zur Krise, pp 200,213. The Bank used restrictions because it believed that no feasible rise in discount would have been effective. Cf.Schacht's statement E-A V/1 Die Reichsbank, p 147; W Prion, Der Deutsche Geld- und Kredit-Markt ..., p 340; Wd 10/1(1925), p 588, 'Der Kreditmarkt und die Industrie III'.

*27 Wk 3(1924), pp 150, 282, 391-2, 396; Wd art.cit. *24; 9/1 (1924) pp 807ff, 'Der Devisenmarkt in den letzten Monaten'.

*28 F Muller art.cit. *19, p 203. Hardach, Weltmarktorientierung, p 39.

*29 Wd 10/1(1925) pp 9ff (cf.*22); Wk loc.cit. *27.

By the last months of the year the first (post-stabilisation) formal flotations of German bonds abroad were registered *30. Secondly, the easing of the money market was probably also related to the reflux of cash balances belonging to the public sector, and generated by the strongly developing fiscal surplus, which was seeking short term and liquid employment. Thirdly, the liquidity preference of the banks themselves, aware of their limited rediscount facilities at the Reichsbank, probably contributed to the easing of the money market *31. The recovery of the capital market was much less definite in the latter half of 1924. Equity prices recovered weakly and irregularly between July and October, though more strongly thereafter, and the current yield on bonds fell to nearly 9% by October *32. New domestic share issues and a number of 10% gold mortgage bond flotations also began to appear from that month *33. The fact that the increasing fluidity of the money market was to no small degree an expression of the liquidity preference of some of its main participants implies relative

*30 Wk 3(1924) p 406; 4(1925) pp 88ff; R Kuczynski, Deutsche Anleihen im Ausland, p 21.

*31 On the fiscal surplus see below pp 92ff. Wk 3(1924) p 282; Wd 9/2(1924) p 1104; 10/1(1925) pp 209ff (articles on money market); R Arzet, 'Die Entwicklung der Zinssätze ...' (in Centralverband ... Materialien ...) p 23; Bopp op.cit. p 480.

*32 Currient Yield = coupon rate divided by price. True yields were doubtless higher (see *21).

*33 Wk 3(1924) pp 393, 399; Wd 9/2(1924) pp 1104ff.

retardation of the recovery of the capital market *34.

Money rates levelled off at 9-11% in early 1925 - ie at around Reichsbank discount rate which was cut from 10% to 9% on 26 February, and at a level still considerably above foreign market rates (4-5%), or foreign currency borrowing rates in Germany *35. This levelling off is usually ascribed however to a reduction in the rate of inflow of foreign funds in early 1925, associated with the raising of discount rates at that time by both the Federal Reserve Bank of New York and the Bank of England, and with the 'hot money' flows into sterling (connected with sterling's expected return to gold) *36. At the same time the Reichsbank initiated a kind of open market policy which reduced the fluidity of the money market. The aim of this policy was to re-establish Reichsbank control over the administration of public sector moneys which it had lost during the inflation: the method was the sale of rediscounted bills from its own portfolio to the various public funds' managers, thus providing them with a

*34 R Arzet, loc.cit. *31: "Durch diese Tendenz (sc. 'die Neigung der öffentlichen Körperschaften, Geld entweder nur kurfristig als Tagesgeld, oder liquide in Privatdiskont anzulegen') wurde auch die Wiederherstellung ausreichender Verbindungskanäle zum Anlagemarkt verhindert".

*35 Wk 4(1925) pp 77-81, 178, 182ff.

*36 R Arzet op.cit. p 23; Wk 4(1925) pp 77, 177, 182-3; Wd 10/1 (1925) p 404; 10/2(1925) p 1132. Tables 3 and 4 on pp 22-3 above do not support the theory of a decline in capital inflow before the 2nd quarter of 1925. The domestic blade of the scissors - the inventory boom and the related Balance of Trade deficit - are probably equally important to the explanation.

profitable but still liquid investment *37. The Reichsbank's stock of bills and collateral paper, which had been steady at the quota maximum (2 mrd.Rm.) ever since April 1924, began to drop from December 1924; by April 1925 it was only 1.35 mrd.Rm. *38.

A more dramatic development in early 1925 was the collapse of share prices (from February). The causes do not seem clear. Since bond prices scarcely fell at this time, it cannot be explained very well as the reflex of stiffening conditions in other markets *39. It was variously ascribed to disillusionment with the gold mark initial balance sheets of the companies, (of which the majority appeared in late 1924-early 1925) and with the failure of many companies to return dividends *40. However one explains the reversal of expectations which caused the turning point, the severity of the decline must be related to the extreme decline in stock exchange turnover after February;

*37 E-A V/1 Die Reichsbank, p 65; E Puhl, Reichsbank: Wiederaufbau des Geld- und Kapitalmarktes (Untersuchung des Bankwesens Teil I, III/2) p 219; Hardach stresses this policy: Weltmarktorientierung... pp 52ff. Contemporary comment suggests that it became effective from Feb.-March 1925. See Wd 10/1(1925) p 209, 641; Wk 4(1925) pp 76-7,177 - these report continued excess liquidity on the money market in Dec/Jan because of public funds, but Wd 10/1(1925) p 404, and Wk 4(1925) p 325 report the effects of Reichsbank measures.

*38 Data from Hardach, Thesis p 249. Lütke, op.cit. p 213 seems to ascribe this decline to the fact that discounters were bypassing the Reichsbank in favour of cheaper foreign facilities. This theory (doubtless true of 1926) has to explain why the gap between German and foreign interest rates failed to narrow before the end of 1925.

*39 Wk 4(1925) pp 68-9, 172-3, and esp. 427:"[Die sogenannte wertbeständige Anleihen] blieb von der allgemeinen Baisse des Aktienmarktes verschont, obwohl im laufenden Jahr eine beträchtliche Zunahme an festverzinslichen Neuemissionen (ie mortgage bonds - TB) erfolgte".

*40 S W Flink, op.cit. p 170.

the resultant 'thinness' of the market would reduce the potential liquidity of security holdings, and thus tend to intensify the speculative movements *41.

In the wake of expectations depressed by the general financial and business crisis from mid-year *42, the capital market remained inactive, and prices low till the end of 1925; by contrast, German capital issuing abroad picked up from the last quarter and at the same time (owing to renewed influx of foreign funds) the money market eased *43.

From the beginning of 1926 money rates began to fall rapidly and by mid-year, at 4-6%, were close to international levels. Reichsbank rate followed the easing of the market reluctantly; as a result rediscounting at the Reichsbank fell steeply since it was cheaper to rediscount abroad *44. Thus there developed "two Reichsbanks in Germany; firstly the bank which [Dr Schacht] represented, and secondly that

*41 See Konj.Stat.Hdb.(1936) p 115. Wk 4(1925) p 317 (esp. on Stinnes crash). See also for theoretical discussion P Davison, Money and the Real World, pp 61-69, 319-335.

*42 Notably affected by the 'Stinnes crash' in July. Wk 4(1925) pp 251-2, 363-4; Wd 10/2(1925) p 1319.

*43 Wk 4(1925) pp 425, 434 ff; Wd 10/2(1925) 'Geldmarkt und Börse', pp 1513, 1696, 1805, 1951. The simultaneous swing of the Balance of Payments into surplus, owing to the recession, would work in the same direction.

*44 Wd, 'Der Geldmarkt', 11/1(1926) p 709, 11/2(1926) pp 1063,1378, 1708; Wk 5(1926) pp 153,391. Reichsbank holdings of eligible bills and collateral fell from 1.7 mrd.Rm. in August 1925 to 0.9 mrd.Rm. in Nov. 1926: Hardach, Thesis, p 249. See too Hardach, Weltmarktorientierung ... pp 69ff.

The Reichsbank abolished the now irrelevant quota at the end of 1925.

which consisted in foreign credits" *45. The 'second' robbed the 'first' of its ability to control the development of the money supply, since the 'first' Reichsbank's stock of assets was too small for the conduct of effective open market operations *46. In July 1926 Schacht abolished the fixed exchange rate (thus freeing the exchanges within the gold points) to discourage the short term inflow; it had little effect *47. To the end of 1926 public authorities were still awash with cash (not now so much through current surpluses, as through the need to retain large precautionary balances in view of inadequate borrowing rights at the central bank *48) and these too were likely to depress money market rates *49.

What effect had this easing of the money market on bank lending conditions? The general reduction is obvious from Table 5 overleaf.

*45 Schacht before the bank commission of enquiry (Enquete Ausschuss) according to Hardach, Die beide Reichsbanken ... pp 373-4. See also E-A V/1 Die Reichsbank, pp 63-4.

*46 H Neisser, Die alte und die neue Reichsbank ... pp 314-6; Wd 12/1(1927) p11; also refs. *45. The Reichsbank tried to reduce market fluidity by the issue of 'sola' bills through the Golddiskontbank, but evidently with small effect.

*47 E-A V/1 Die Reichsbank, p 76; Hardach, Weltmarktorientierung ... pp 75-6.

*48 H Neisser op.cit. pp 324-6; Ilse Maurer, Reichsfinanzen und Grosse Koalition ... p 14.

*49 Wk refs. *45; Wd 'Geldmarkt und Börse' 11/1(1926) p 601, 11/2 (1926) pp1063,1378,1708. See too Schacht's report to the Reich government on 7.3.27: BA R43 I/635, Bericht des Herrn Reichsbankpräsidenten ... Schacht tried to keep control of public moneys by fulmination (see report just cited; also Wd 11/2(1926) p1810, 'Reichsbank gegen Kreditanarchie') and by negotiation (Wd 12/1 (1927) pp 665-7). Neither was very successful.

TABLE 5 Deposit Rates and Lending Charges of Berlin Credit Banks % p.a.

	Clients Deposits		Lending Charges	
	i) Immediate Withdrawal	ii) 15-30 Days Notice	iii) Overdrafts	iv) 'Kontokorrentkredite'
1.7.24-15/19.7.24	12	15	50	(July) 30/36
19.7.-1.10.24	8	12	39	(Aug.) 24/27
				(Sept.) 21/24
1.10.-1.11.24	6	9	30	(Oct.) 16/20
1.11.-31.1.25	6/5%	9/8%	25%	(Nov.) 16/18
				(Dec-Jan) 15/17
1.2.-1.3.25	5	8	18	(Feb.) 15/16
1.3.-1.10.25	5	7	17	14
1.10.25-13.1.26	5	7	17	13.4
13.1-1.3.26	4	6	16	12.4
1.3.-27/29.3.26	4	5½	16	11.4
27/29.3.-1.5.26	3	5	14	10.4
1.5.-7.6.26	3	5	12½	10.4
7.6.-6.7.26	3	5	12	9.9
6.7.-9.8.26	3	5	11½	9.4
9.8.-1.9.26	3	4½	11½	9.4
1.9.-12.1.27	3	4½	11½	9.0
12.1.27 -	2½	4	10½	8.0
[Dec1927]	[4]	[5]	[12½]	[10.0]
1928	4	5	12½	10.0
Jan-April 1929	3½	5	12	9.5
April-May 1929	4½	6	13	10.5
May-June 1929	5½	6	14	11.5
June-Nov 1929	4½	6	13	10.5
Nov-1929-Jan 1930	4	6	12½	10.0

SOURCES: 1.7.24 - 12.1.27: Wk 3(1924) p 398; 4(1925) p 179; 5(1926) pp 154,272; 6(1927) p 37.
Dec 1927-Jan 1930: Konj.Stat.Hdb. (1936) pp 110-111. (Tables *8, *10, *7, *5.

I turn to consider the difference between bank lending and borrowing rates. If in this Table we consider the gap between column ii) - deposits at 15-30 days notice, and column iv) - Kontokorrentkredite', we see that between July 1924 and March 1925 it was reduced from c.18% to 7½%. This gap fell slightly to 6½% by the end of 1925. It then fell to 4% by early 1927. This implies that bank policy closely followed the development of the money and capital markets except that the effects of the crisis of the summer of 1925 may not be fully reflected in these data. The comments of Die Wirtschaftskurve suggest that between July-October 1925 banks were seeking to improve their liquidity - as a result perhaps of their involvement in the bankruptcy crisis *50.

The easing of 'Kontokorrent' charges in October 1925 probably reflects a slackening in the demand for credit, but certainly from 1926 the easing of bank liquidity and lending policies again runs parallel with the easing of market conditions - and the renewed inflow of funds *51.

Since the easing of the money market in late 1925 was largely an expression of the liquidity preference of financial institutions, bond

*50 Wk 4(1925) pp 328-9, 434, 436-7. According to p 435 real cost of bank credit to industrial/commercial clients may be "somewhat dearer, where obtainable" in Autumn 1925, despite unaltered official charges, because of stricter collateral requirements. In early 1926 the liquidity preference of banks is said to have diminished: Wk 5(1926) p 151, and S W Flink, op.cit. pp 177-8.

*51 But in 1926 the Reichsbank had to urge banks to reduce their charges, according to Bopp, op.cit. p 478.

prices failed to rise; share prices continued to fall *52. New issues of both were very small, and stock market turnover reached a minimum *53. But from the beginning of 1926 bond and share prices began a climb which continued without interruption till February 1927, and, on its crest, new capital issues, beginning with gold mortgage bonds and spreading to other classes of bonds and equity, gathered momentum throughout the year. Stock market turnover rose rapidly; from the beginning of 1926 foreign participation was deemed an important element. 1926 is often regarded as the year when the German stock market 'reopened' *54.

Foreign capital imports recovered strongly from as early as autumn 1925, and remained at a high level throughout 1926 *55. In December 1926 Dr Schacht, alarmed at the rate of increase of foreign indebtedness, prevailed on the government to suspend the exemption from capital yield tax which had hitherto (in practice) been enjoyed by all private sector foreign bonds (and by 'approved' public sector foreign bonds). As a result, foreign capital issues practically ceased in the first half of 1927 *56. A few weeks later Schacht reduced Reichsbank discount

*52 Wk 4(1925) p 364, 'Missverhältnis zwischen kurz- und langfristigen Krediten', 5(1926) p 30; Wd 10/2(1925) 'Geldmarkt und Börse', pp 1805,1951.

*53 Konj.Stat.Hdb. (1936) p 115.

*54 Wk 5(1926) pp 144-158,378,394 ('Re-opening' - p 393); Wd 11/1(1926) pp 123,601, 11/2(1926) pp 1063,1708. B Benning, Der 'schwarze Freitag'... p 88.

*55 Wk refs *53, *54.

*56 F Speth, Deutschlands Auslandverschuldung ... pp 72-4; Wk 6 (1927) p 41,152. Thus German borrowers were excluded from a very buoyant period on the New York market: C C Abbott, The New York Bond Market 1920-1930 pp 108ff. For the 'approval' procedure for public foreign bond issues, see below pp 104ff.

rate to 5% to discourage the foreign short term inflow *57. Schacht evidently believed that the domestic capital market could cope on its own. Already however, in autumn 1926 there had been signs that it was absorbing the flood of new issues with a little difficulty *58. This of itself was not unusual in relation to pre-war experience *59, but in February 1927 the first post-stabilisation bond issue of the Reich (for 500 mill.Rm.) proved a failure; considerable quantities were quickly resold by first (speculative) buyers, so that the issuing consortium had to support its price heavily *60. The failure was variously ascribed to i) the low coupon rate - 5% (issued at 92% of par); the loan was intended to establish the 5% rate as 'standard' *61; ii) the sheer size of the issue *62. At any rate the experience gravely weakened the domestic bond market for the rest of the year,

*57 Bericht ... 7.3.27 (ref *49). A further aim may have been to ease the Reich's bond issue: A G for Reparations, Memorandum of 20.10.27, p 17(manuscript copy). But see *62 below.

*58 Wd 11/2(1926) p 1378; Wk 5(1926) p 393; DBZ 5.1.28, 'Der deutsche Kapitalmarkt im Jahre 1927'.

*59 P Kempner, Die Verhältnisse am Geldmarkt (Centralverband ... Materialien ...) p 33.

*60 Wd 12/1(1927) pp 316,617; 12/2(1927) p 1252 (coupon raised to 6% in August); Wk 6(1927) pp 36,40,151.

*61 Wd 12/1(1927) p 159, 'Geldmarkt und Börse': "Hierdurch sucht man den Vorkriegsverhältnissen zu nähern." Wk 5(1927) p 40. It was also the first major post-stabilisation bond without a fine gold clause.

*62 View of Schacht; see Bericht ... 7.3.27 (ref *49). But some blamed the failure on the uncooperativeness of the Reichsbank: DBZ 21.6.27 p 11, 'Kreditbarometer'.

inhibiting new domestic issues till early 1928, and engendering a slow price fall which lasted (as it turned out) till the end of the decade *63.

The domestic share price index also faltered in February, probably as a repercussion of the overloaded bond market, but it recovered its momentum in March-April *64. From February most money market rates began to rise. In addition to the 'open market' effect of the Reich flotation, this can be ascribed to i) the reduced inflow of the proceeds of foreign capital issues *65, and ii) the deterioration of the balance of payments (current account). Throughout the first half of 1927 the Reichsmark was below parity on the exchanges *66. Finally iii) the gathering domestic upswing would increase the demand for 'transactions balances'.

But the share price index drove relentlessly upwards. Most contemporaries seemed to believe that, by spring 1927, prices were 'too high' *67, and probably a consensus was worried by the degree to which

*63 Table 2a p 21 . W Hagemann op.cit. p 67 (re industrial bonds). On public sector bonds, see below pp 101ff .

*64 Wd 12/1(1927) pp 316,473. Wk refs *60.

*65 The fluidity at the turn of 1926/7 was commonly traced to short-term employment of the proceeds of foreign bond issues: Wd 10/2(1926) p 1709; Schacht, Bericht ... (ref *49).

*66 Wk 6(1927) p 388; cf. Wd 12/1(1927) p 462.

*67 eg Wd 12/1(1927) pp 462,665-7; Wk 6(1927) pp 42-3. C Duisberg (chairman, IG Farben) expressed himself against the speculation: B Benning, op.cit. pp 94,112; also C F von Siemens: Wk 6(1927) p 153. The 'realism' of share prices was calculated with respect to 1926 dividends, cf. Vjh.Konj.forsch. 1927 H1 p 19(which thus gives the return on equity as 5.67% in 1913, 3.56%). For further discussion see B Benning op.cit. pp 112ff; also pp71 below.
Margin requirements were raised in Jan/Feb Ibid. pp 117-8.

the speculation seemed to be supported by foreign funds. Among these was Dr Schacht *68. To this he added worries about the declining gold and foreign exchange reserves of the bank, and the growing bill portfolio; yet he wished to avoid an increase in discount rate which would merely attract more foreign funds. Believing that in the long run the foreign exchange weakness would be aggravated by the repatriation of profits from the stock market, and believing also that cash balances ought to be diverted from unproductive, speculative employments to the productive use of financing industry and trade *69, he sought to persuade the credit banks to reduce their lending to the stock market, reinforcing his 'suasion' with the threat of the selective restriction of rediscount facilities to recalcitrants *70. The relationship between Schacht's 'suasion' and the credit bank's action is not quite clear *71, but on 13 May 1927 the Association of Berlin Banks issued the following communique:

*68 See the documentation of his utterances in B Benning op.cit. pp 93ff; also in Schacht's Bericht ... (ref *49).

*69 Schacht's views can be gleaned from his Bericht ... (ref *49); from E-A V/1 Die Reichsbank pp 65ff, 200ff; and DBZ 31.5.27, 'Schachts Rechtfertigung' (report of his Stralsund speech); further B Benning op.cit. pp 102 and especially pp 119-132. Benning (pp 138ff) asserts that Schacht himself added fuel to the speculation by failing to reduce Lombard rate in January when he cut discount rate, thus supporting the high stock market money rates.

*70 Hardach, Weltmarktorientierung ... pp 78ff; Bopp op.cit. p 478.

*71 In his Bericht.... of 20.1.28 (BA R 43/I 635), Schacht refers to "the somewhat curious communiqué". The banks sought to blame Schacht. Some blamed the government, who vigorously denied cognizance: Benning op.cit. pp 98-9.

> "The members of the Association of Berlin Banks and Bankers (Stempelvereinigung) have reached an agreement today to effect a gradual but significant reduction in moneys lent for Report and Lombard purposes, and in other forms of credit on securities. As immediate action they will reduce stock exchange Report and Lombard lending by 25% before the mid-June settlement, and undertake further restrictions by the following settlement dates. Loans to clients (sc. 'against securities') will be treated in the same manner. The cooperation of financial institutions outside the Association is expected" *72.

The communique was issued just before the mid-May settlement date; it caused a dramatic fall in forward prices (pertaining to the mid-June date) and hence in current prices *73. The share price collapse seems grossly to have exceeded the intentions of the instigators of the action. Report and Lombard lending was indeed reduced by c.25% by mid-June; thereupon the Association, after discussion with Schacht, issued a second statement that further credit restrictions were not intended *74. A brief recovery of share prices in July was followed by a renewed decline, which continued, punctuated by weak, irregular recoveries, to 1932. Stock Exchange turnover slumped *75. Despite his efforts, Schacht had to raise discount rate to 6% in May, and the next month, following the evident double collapse on the stock

*72 Translated from Benning op.cit. p 93. In explanation: forward contracts on the Berlin stock exchange were made usually for settlement on either the middle or the end of the month; cf. Northrop op.cit. p 128. See too p 17 above.

*73 B Benning op.cit. p 97.

*74 B Benning op.cit. pp 98,145. The statement said that "the aims of the action of 13.5.27 had already been achieved". Wd 12/2 (1927) p 1009 reports a slight price recovery in July - but a very small turnover.

*75 Konj.Stat.Hdb. (1936) p 115. Benning op.cit. p 147: "Es wurde bald offenbar dass sich ... die Struktur der Börse entscheidend verändert hatte".

market (shares and bonds) exemption of foreign issues from capital yield tax (under certain conditions) was reintroduced *76. Thereafter German borrowers floated large quantities of bonds in the U.S. (and increasingly, on European markets) for about a year. But issuing was never again as trouble-free as it had been before December 1926. Repeatedly one reads reports of the temporary saturation of the American market, and of the inability of issuing houses there to achieve a final placement of bonds *77. German borrowers were compelled to 'dress up' their bonds by a variety of adornments to render them attractive, eg with option rights to equity *78. There were probably three reasons for these symptoms of deficient demand for German long-term debt:

i) The backlog of the supply of German bonds, pent up in the first half of 1927 'overloaded' the market. It can be seen from Table 3c p 2/10 that the nominal values of bonds issued abroad in each of the four quarters July 1927 - June 1928 exceeded that of practically every other quarter during 1925-29.

ii) Political controversies, stirred up by the foreign press and the Agent-General for Reparations, about the priority of Reparations claims over other foreign-owned debt, and about the 'unsoundness' of German

*76 Wk 6(1927) pp 148,262. DBZ 21.7.27 p 1, 'Kapitalschutzzoll'.

*77 Wk 6(1927) p 385, 7(1928) pp 145, 150, 255; Wd 13/1(1928) articles 'Zur Lage' pp 1, 165, 549. W Hagemann op.cit. pp 68-9.

*78 IHZ 16.7.27, 'Die Speculation sondiert'; DBZ 28.2.29 p 5, 'Wachsende Schwierigkeiten bei der Kapitalbeschaffung'.

public financial policies, reduced foreign willingness to hold German bonds *79.

iii) The stock market boom in the U.S. tended to reduce bond prices (even of domestic U.S. bonds) and hence their saleability, because of the speculative gains to be expected on equity holdings *80. Other capital markets were smaller and their absorbtive capacities more quickly exhausted *81. After mid-1928, when German bonds became practically unsaleable in the U.S. *82, certain firms sold equity abroad, but public disapprobation of the 'alienation' (Überfremdung) of German property to foreigners inhibited its being largely practised *83. Public Authorities could of course only issue bonds.

The domestic capital market remained very unreceptive to new issues

*79 R Arzet op.cit. p 24. In the source to Table 2bii) p 2/9, the price index of German bonds in New York dips perceptibly in November 1927. See Wk 6(1927) pp 384-5; Wd 12/2(1927) p 1693. The general failure of German New York bond prices to rise as did domestic U.S. bond prices in later 1927, may reflect the above-mentioned 'overloading'. See Table 2b p 21 .

*80 C C Abbott op.cit. pp 116-127, 167, 200-202.

*81 Wk 6*1927) p 262: "[die] allerdings rasch eintretende Erschöpfung des Marktes". 8(1929) p 25.

*82 DBZ 24.8.28, p 8, 'Kreditbarometer'; 28.2.29, p 5 (see *78).

*83 eg Commerce Reports 28.10.29, p 203, 'Foreign Capital Issues'. Cf. the controversy over the sale by AEG of a minority shareholding to General Electric, and over the sale of Opel to GM. Wd 14/2(1929) p 1361, 'General Electric - AEG'; Berliner Tageblatt 15.10.29. 'Siemens gegen AEG'; BBZ 16.10.29, 'Der AEG erwidert Herrn von Siemens'; DBZ 12.3.29, p 1, 'Die Überfremdung der Opelwerke'. More generally, Neue Zürcher Zeitung 4.9.29, 'Deutsche Kapitalwanderungen'. For a recent discussion: K Gossweiler, Grossbanken, Industriemonopole, Staat, pp 331, 341ff.

for the rest of 1927 *84. In 1928 the stock market turnover remained generally at the low level of later 1927, and heavily dependent on foreign participation *85. Domestic share and bond issues exceeded those of 1927 substantially, but at the expense of higher yields *86, and of recurrent 'overloading' of the market *87. The state of the bond market deteriorated in the last months of 1928, recovered somewhat in early 1929, then relapsed to a poor state for the remainder of the year *88.

Perhaps the most significant wider consequence of the stock market collapse of May 1927 was a signal deterioration of the liquidity of the

*84 Wd 12/1(1927) pp 96f; 12/2(1927) p 1168; 13/1(1928) p 1; Wk 6(1927) p 349; IHZ 31.12.27, p 5, 'Gute Nerven'; DBZ 29.9.27, p 7, 'Kreditbarometer'; 25.10.27 p 5, 'Der Industrielle Kapitalmarkt'; 25.11.27 p 8 and 22.12.27 p 5, 'Kreditbarometer'; 5.1.28, 'Der deutsche Kapitalmarkt im Jahre 1927'; Vjh.Konj.forsch. 1927 H3 p 10.

*85 Konj.Stat.Hdb. (1936) p 115; Wk 7(1928) pp 24-5,31,250; Bericht des Herrn Reichsbankpräsidenten 13.4.28 (BA R 43 I/635); IHZ 23.6.28 p 3, 'Börse und Kapitalmangel'; DBZ 23.5.28 p 6, Kreditbarometer'; F Schröder, 'Fragen des Kapitalmarktes' in Bankarchiv XXVIII (1928) pp 28ff.

*86 Alternatively, bonds had to be decked out with special attractions; eg the preference shares sold by the German Railway Co. in early 1928: Wk 7(1928) pp 24-5: or the bond issue of IG Farben: DBZ 22.12.27 p 5, 'Kreditbarometer'.

*87 Wk 7(1928) p 145, 250; IHZ 10.3.28 p 3, 'Abschwächung der Börse'; 26.4.28 p 1, 'Drosselung der Kommunalen Auslandsanleihen'; DBZ 24.2.28 p 7, 23.3.28 p 1, 23.5.28 p 6, 'Kreditbarometer'.

*88 Wk 7(1928) p 359; 8(1929) pp 23,139,242,359; IHZ 15.12.28, p 3, 'Schwache Börse ohne Auslandsinteresse'; 6.1.29 p 1, 'Schonung fur den Kapitalmarkt!'; 25.1.29 p 1, 'Beschäftigungsloses Geld?'

The most notable event was the failure of the Reich 300 mill.Rm. bond flotation in May 1929. See below pp120 .

economy as a whole - evidence of a reduction in the supply of, or increase in the demand for, money. Statistically this is expressed in the c.2½% rise in market bill rates in 1927, and in the increasing number of protested bills, despite continued economic prosperity *89. Contemporary impressionistic evidence of the deterioration of payments habits, lengthening of (involuntary) trade credit, is multiple *90. This deterioration in general liquidity seems to be related to the fact that the liquidity ratios of the banking sector improved between 1926-27 - the only improvement registered in the period 1924-31 *91. The rise in interest rates shows that this improvement cannot be ascribed to an excess supply of money. Rather it seems to have been caused by a redistribution of bank assets, reducing loans to clients relative to liquid assets. This is indicated by the fact that credit bank charges on Kontokorrent and overdraft increased, as did the gap

*89 Table 1 p 2/8. Protested bills: Wk 7(1928) p 429; cf. Vjh.Konj.forsch. 1928 H1A pp 15-16.

*90 A high level of 'tension' in trade credit was a characteristic of the years after stabilisation: W Prion, Der deutsche Geld- und Kapitalmarkt pp 353-4. It seems to have increased in later 1927 vis a vis the turn of 1926/27: MdW 11.8.27, 'Zahlungsstockungen'; 2.2.28 p 161, 'Devisenpolitik und Geldschöpfung'; LV 16.12.27 p 341; Vjh.Konj.forsch. 1927 H2 p 5, H3 p 5; Wk 6(1927) p 350; 7(1928) p 7; Wd 12/2(1927) pp 1321, 1481. Significant in this context is the lively controversy in the National Association of Chambers of Commerce (Deutscher Industrie- und Handelstag) about the growing practice of allowing cash discounts on payments by commercial bills. This, together with the results of a questionnaire issued to ascertain attitudes to, and the prevalence of, this practice is to be found in BA R11/1375.

*91 F W Henning, 'Die Liquidität der Banken in der Weimarer Republik', pp 51,55,59. For a parallel analysis with respect to the post-war U.S.A. see A H Meltzer, 'Monetary Policy and the Trade Credit Practice of Firms'.

between these and interest paid on deposits *92. Three reasons can be adduced for this renewed search for liquidity by the banking sector. Firstly there was the effect of the collapse of the domestic stock market on the liquidity of their long term assets. Secondly, the same collapse, plus the difficulties of foreign placement in later 1927 increased the likelihood that bank loans to clients could not be released by capital issues in the normal way, ie that they would be 'frozen in'. Thirdly, the action of the Reichsbank may have renewed apprehension that in an emergency it would not act as a lender of the last resort *93.

Between mid-1927 and the end of 1928 the Reichsmark was consistently above parity (though tending to weaken in later 1928) despite a passive Balance of Payments current account *94. This implies that in the whole period the inflow of funds was considerable; and other sources confirm that it was *95. Despite this, the money market remained

*92 Table 5 p 32 .

*93 E-A V/1 Die Reichsbank p 200:
"Vorsitzender: Man kann also feststellen, dass, durch die Vorgänge der Börsenrestriktion, die Liquidität der deutschen Grossbanken vermindert worden ist?
Schacht: Ich möchte sagen noch nicht verbessert worden ist".
See whole section. Further, Bericht ...(ref *85) pp 17-18; Wd 12/2(1927) p 1009; DV 11.11.27 p 163; Bopp op.cit. p 1480. Signs of increasing unconsolidated bank credit in the economy are discussed below pp 73-4 .

*94 Wk 7(1928) pp30,363; Reichsbank reserves reached a peak for the decade in December 1928: Hardach, Thesis p 249.

*95 DBZ 1.4.28 p1, 'Kurzfristiges Auslandsgeld'; Vjh.Konj.forsch.1928 H1A p5. The inflow took the form especially of short term bank deposits: F W Henning op.cit. p 73; also Wk 8(1929) pp 43ff, 'Die Grossbanken als Kapitalimporteure', according to which c.45% of bank deposits were currently foreign; Vjh.Konj.forsch. 1928 H3A p 11. The short term inflow may partly express a 'spillover' interest in German shares from the Wall St. boom: R Arzet op.cit. pp 25-6; Vjh.Konj.forsch. 1929 H1A p 42, 'Auswirkungen der internationalen Kreditverhältnisse'; also R E Luke op.cit. p 242.

tight and relevant interest rates continued to rise to c.August 1928. (One subsidiary reason for this was probably the growing deficits and declining cash balances of the public sector *96). Thereafter money market conditions eased a little, perhaps in consequence of the domestic recession, and continued so till March-April 1929, yet the huge amount of foreign financed short-term debt was said to create a platform below which rates could not fall without prompting withdrawals *97. Nevertheless the Reichsbank felt it safe to cut discount rate to 6½% on 12.1.29 *98. But these conditions did not last. The speculative flows out of the Reichsmark in May 1929 (actuated by the crisis in the Reparations negotiations) caused a tightening in money market conditions which lasted till the Wall Street crash *99.

Bank credit and liquidity conditions in the economy at large seem to have remained very tight throughout 1928, no doubt because of the huge short term debt 'overhang'. In early 1929 bank charges were reduced, yet the files of the National Association of Chamber of Commerce (Deutscher Industrie- und Handelstag) point to scarcely diminished difficulties in securing prompt payment and the like *100. Bankruptcy statistics,

*96 Wd 13/1(1928) p 785; Bericht ... (ref *85) p 17-18; R Stucken op.cit. p 73 stresses this aspect. More generally see below pp 101ff .

*97 German banks paid surcharges on foreign deposits in later 1928 to prevent their withdrawal, according to R Arzet op.cit. p 24. See too Wk 7(1928) p 250; 8(1929) pp 40,43.

*98 DBZ 6.1.29 p 1, 'Faktoren der Diskontpolitik'; IHZ 12.1.29 p 1, 'Die Begründung der Diskontermässigung'; 18.1.29 p 1, 'Der Geldmarkt nach der Diskontermässigung'.

*99 Wk 8(1929) pp 135,239,355.

*100 BA R 11/1370 (Files of Deutscher Industrie- und Handelstag). DBZ 5.4.28 p 1, 'Abnehmende Zahlungsfähigkeit der Industrie'; Vjh.Konj.forsch. 1928 H1A p 10; Bericht des Herrn Reichsbankprasident ... 7.2.29 pp 4-7 (BA R 43 I/636).

protested bills of exchange, fell a little in later 1928 after a mid-year peak, but remained higher than in 1927 *101.

*101 Wk 7(1928) pp 429; 8(1929) p 434.

CHAPTER 3 FINANCIAL MARKETS and MONETARY POLICY - ANALYSIS

3.1. The Relationship between Short and Long Rates: Preliminaries

High interest rates were the most obvious characteristic of the post-stabilisation financial markets. The counterpart of this in the banking sector is the larger gap (than pre-war) between lending and borrowing rates, which, in a severely competitive banking system *1, presumably shows that the price at which banks were willing to sacrifice liquidity had risen *2. Widespread evidence that the banks demanded much better *3 (and more liquid) security on loans probably

*1 On competition in the banking sector see above pp 17-18. Further M J Bonn, 'Die Wirkung des hohen Zinsfüsses auf Handel und Bankwesen', pp 375-6; K E Born, Die Deutsche Bankenkrise pp 24-9. The credit banks' own view is found in Centralverband des deutschen Bank- und Bankiergewerbes, Materialien ... pp 146ff, 'Die veränderte Kosten- und Rentabilitätsverhältnisse'. The prevalent charge of bank monopoly seems hard to reconcile with this evidence: see K Diehl, 'Ursachen des hohen Zinsfüsses', pp 896-7; H Rummel, 'Wie wirkt sich die Kostenelemente im Zinssatz aus?' p 436. Contemporaries also blame high handling costs, due to higher wage bills. But this was a universal grumble.

*2 Cf. F Döring, 'Kreditmärkte und Zinssätze ...', pp 419-20: 'Die vielfachen Bestrebungen der Reichsbank und auch der öffentlichen Stellen, die Kreditkosten im allgemeinen zu senken, griffen in der Regel bei der Zinsspanne ein ... Die Banken verteidigten ihre Höhe mit der Steigerung der Unkosten und mit der Etragsverminderung infolge der Notwendigkeit, ihre im Durchschnitt gegenüber der Vorkriegszeit verringerte Liquidität... zu erhöhen ...'. But see too *17.

*3 E-A V/1 Die Bankkredite pp155-67; W Prion, 'Der deutsche Geld- und Kapitalmarkt' pp352-3. The 'widespread comment' arose because the practice was thought to discriminate against smaller business.

tells the same story *4.

How are these manifestations of monetary stringency to be explained? In the common contemporary view the 'basic' interest rate (Landeszinsfuss) was the rate on long bonds. Following a 'real' theory of interest, which conceived of the financial markets as merely the equilibrators of the supply of savings and the demand for capital, they viewed financial assets as standing in a one-to-one correspondence with the physical capital stock of the economy. Hence they evolved a theory of 'capital scarcity' (Kapitalmangel, Kapitalarmut) which led them to blame (i) the poor state of the physical capital stock (as the cause of the heavy demand for capital) and (ii) the low rate of savings *5.

Other explanations start at the other end, viewing short rates as 'basic', and thus relating the high level of all interest rates to the increased demand for money. G Hardach's recent study, notably,

*4 Cf. A D Bain, The Control of the Money Supply, p 114. Nevertheless, in spite of the increased liquidity preference thus expressed, the liquidity ratios of banks actually fell, both within the period and relative to 1913. See F W Henning, 'Die Liquidität der Banken ...', pp 51,55,59. (Actually this statement is true for pure cash ratios, and for the sum of cash + deposits at other banks + short term first class paper, but not, for some reason, for cash + deposits alone.) This is presumably because the 'selling' of money is the business of banks, so that their own demand schedule for money, though higher than pre-war, had not risen so much as that of the non-banking sector. The non-banking sector was willing to pay the higher charges for money which the banks demanded, to such a degree that the net effect of the interaction between the two sectors was lower bank liquidity ratios.

*5 See eg Adolf Weber, Allgemeine Volkswirtschaftslehre, pp 124-41, 311-21; Gustav Cassel, Theory of Social Economy Vol. 1, pp 189-248 (esp. pp 224ff).

emphasises restrictions on the money supply, proximately because of Reichsbank policy, but ultimately because of the inherent weakness of Germany's external position, related above all to an overvalued exchange rate *6.

These views can be evaluated adequately only with the aid of a complete model of the economy. At present I confine myself to an attempt to build up a simple model of the financial markets, which is capable of explaining the observed phenomena.

3.2. The Behaviour of Short Term Interest Rates

In modern theory the analysis of the rate of interest begins from its role as the price relation between money now, and money in the future *7. The upward displacement of interest rates is hence capable in principle of only two explanations. Firstly by positing an increase in the stock of interest-bearing debt relative to money, so that the price of the former in terms of the latter falls. Secondly by positing a shift in the preferences of asset holders in favour of money, with the same effect on prices, given relative stocks.

In 1925/29 the German currency stock averaged 6.1 mrd.Rm., whereas in 1907/11 it had averaged 5.9 mrd.Rm. Of course non-cash payments

*6 G Hardach, loc.cit. in *5.

*7 T Scitovsky, Money and the Balance of Payments pp 49-65. Changes in interest rates are evidence only of 'unbalanced' excess supply/demand for different financial assets; balanced excess supply/demand of all such assets would only affect real variables, not interest rates.

methods were increasingly important, but I compare the fact that in the USA the currency stock grew two-and-a-half fold in the same period, and grew faster, relative to NNP/GNP than did the German *8. Estimates of the change in the total quantity of interest bearing debt are hardly obtainable. It is practically certain that the aggregate stock of long term debt in 1929 was 75% or less than that of 1913 *9. The available estimates of the stock of shorter debt indicate that, by contrast this was c.33% greater *10. The same sources indicates that the total stock of debt was less. But it seems to exclude large items of shorter debt eg bank advances, trade credit. If it can be assumed that the excluded items grew at the same rate as the included, then we may suppose that the 'true' total stock of interest bearing debt was greater in 1929 than in 1913, but of shorter maturity. Such a conclusion would certainly coincide with the unsystematic impressions gleaned from contemporary writing.

To what extent would such an alteration in the relative financial stocks be attributable to the policies of the Reichsbank? The description in the last chapter certainly conveys the impression of an attempt during 1924-26 to restrict the growth of the money supply, an attempt frustrated in consequence of the difficulty of operation of an independent monetary policy where exchange rates are fixed,

*8 From date in Hoffmann ... p 815, 826; Historical Statistics of the USA, pp 647.

*9 Cf. the estimates in E Wolfgang (a leading expert in the field), 'Der Neuaufbau des Rentenmarktes' - Wk 9(1930) p 84; also Centralverband ... Materialien ... pp 11-12, 27-29.

*10 Centralverband ... op.cit. pp 11-12.

and capital flows unrestricted *11. Between early 1924 and late 1925 (except for Sept. '24 to Feb. '25) the sluggishness of the capital inflow seems to have left Schacht room for his independent 'dear money' policy (credit quotas and high discount rates), actuated doubtless by a desire to maintain currency stability *12. But in later 1924 and again in 1926, rediscount abroad was a cheaper alternative, so that domestic rates fell towards international levels. Having realised the 'two Reichsbanks' problem, Reichsbank discount rate became, from January 1927, more often below than above market levels - in contrast not only with 1924-26, but also with pre-war practice *13. It seems that Reichsbank rate was raised reluctantly to 6% in May 1927 and to 6½% in October. In the former case Schacht engineered the stock market collapse to try to evade an increase *14; in the latter for the same reason he refused for a period to rediscount otherwise eligible foreign currency bills. However the data suggests that Schacht raised the discount rate whenever foreign exchange reserves were approaching 50% rather than the statutory 40%, and not until they reached 70% did he consider reducing the rate to 6½% again

*11 R A Mundell, International Economics, pp 250ff, 'Capital Mobility and Stabilisation Policy'.

*12 Eg Schacht's resistance to government pressure in Feb.1925 to reduce rates further: G Hardach, 'Die beide Reichsbanken ...' p 318; H Müller, Die Zentralbank ... p 40.

*13 See Table 1b p 20. For pre-war rates see Stat.Jb.f.d.Dt.R. as cited in sources to Table 2 p 57 .

*14 K R Bopp, 'Die Politik der Reichsbank...' p 472; Wd 12/1 (1927) p 746, 'Die Deroute an der Börse'; G Hardach, Weltmarktorientierung ... pp 78-9.

in Jan. 1929 *15. A 50% reserve ratio was not unusual pre-war *16; still, there would seem to have been room in 1927-29 for an easier policy; the fact that the Reichsmark remained above parity throughout June 1927 - Dec. 1928 supports this. How much room is a counter-factual question which can only be answered in the light of a macro-economic model; here it suffices to note the plentiful evidence that contemporaries believed that the great dependence of the financial system on foreign short credits created a platform below which interest rates could not fall without provoking serious withdrawals, and the fact that banks paid higher rates in later 1928 on foreign than on domestic deposits *17.

The sum of this section is then i) that it is likely that the stock of interest bearing debt was larger, relative to the money stock than it had been before 1913; ii) that the restrictive rediscount policies of the Reichsbank bear some responsibility for this *17A.

*15 G Hardach, Thesis p 250. This was partly related to a desire to gain reserves in view of impending reparations negotiations.

*16 E-A V/1 Die Reichsbank p 146 (Schacht's testimony); cf A I Bloomfield, Monetary Policy under the International Gold Standard, pp 30ff.

*17 See above pp 44 ; also Vjh.Konj.forsch. 1929 H1A pp 43ff, 'Auswirkungen der internationalen Kreditverhältnisse'; pp 24-5, R Arzet, 'Die einzelne Phasen ...' pp 24-5. When credit banks extended loans in foreign currency, the gap between their borrowing and lending rates was less (H Rummel, 'Die Bank-fragen ...' p 153).

*17A I cannot follow the argument which blames the persistent high interest rates on the gap between gross and net capital inflows, created by the Reparations transfer. This drained foreign exchange, thus inducing a rise in Reichsbank rates, but did not otherwise affect the stock of financial assets.

3.3. The Determination of Interest Rates: Demand Side Factors

3.3.1. An analysis of 'demand side' factors of the determination of interest rates can best be approached via analysis of their term structure. Before doing so certain presuppositions must be clarified. Firstly, do I assume that there exists a set of high quality debt covering the maturity spectrum, all of whose members are perfect substitutes for each other?

If so, then long rates of interest, properly defined, must stand in a definite relationship to current and expected short rates over the expected holding period of the long term debt *18. According to the 'pure' theory, then, the 'holding period yield' (defined as that discount factor which equalises the net present value of coupon payments to be received over the expected holding period plus the selling price expected at the end of it, with the current purchase price) will be identical on debt of all maturities. Thus, if future short rates are expected to fall, present long yields (as just defined) will be below current short rates, and vice versa.

However, it is conceivable that a liquidity or risk premium is added to the discount factor which is applied to long term debt *19.

*18 The main theories of the term structure of interest rates are discussed in H G Johnson, Macroeconomics and Monetary Theory, pp 86-92; J C Dodds and J L Ford, Expectations, Uncertainty and the Term Structure of Interest Rates.

*19 See Dodds and Ford op.cit. pp 31-57, 115ff (esp. p 128). The 'Malkiel' version of the 'pure' theory yields the same prediction. Under some formulations the liquidity preference theory could breach the assumption of perfect substitutability between maturities. The text implies that the premia added to longer maturity yields are invariant to the relative quantities of the maturities supplied, but it is not material to the argument.

But if substitutability is imperfect then on the above considerations is superimposed the effect of alterations in the relative stocks of debt of different maturities. If the argument of the last section is accepted, then the stock of long debt fell relative to 1913, the money stock was much the same, and the stock of short debt probably rose. Given imperfect substitutability, this would imply a fall in long rates relative to short, as compared with 1913, (unless there was an offsetting change in demand preferences).

Secondly, before proceeding to an analysis of the term structure it is vital to note that the Reichsbank could not affect the stock of long dated bonds directly, because of its inability to conduct open market operations in long debt. Thus it could only affect long yields as its operations on the short stock affected the aggregate maturity distribution, and as they affected expectations of future short rates. There is not nearly enough readily available information to undertake a complete analysis of the alterations in the term structure from pre-1914 to post-1924. In the following I shall concentrate on two interest rates: (a) a representative index of short rates and (b) suitable holding period yields of low-risk long-dated bonds *20. The latter have to be inferred by informed guesswork. Nor is it clear what the

*20 Holding period yield calculated from the formula :

$$P_t = \frac{C}{(1+R)} + \frac{C}{(1+R)^2} + \ldots + \frac{C + E(P)_{t+x}}{(1+R)^x}$$

where t = current period; t+x = expected date of resale;
P = current price; E(P)= expected selling price;
C = coupon value; R = holding period yield.

A description of bond types and of contemporary (approximating) yield formulae is given in Wk 7(1928) pp 80ff, 'Verbesserung der Renditenberechnung'.

'representative' short term rate is. There were broadly two classes of such rates: bill rates, and stock market money rates (daily and, post-war, monthly money). Before 1913 the former generally exceeded the latter; after 1924, the converse *21. For 1925-29 I use the average of two bill rates and of daily and monthly money *22. For pre-1913 I had estimates of market discount on first class bills only (Marktdiskont = Privatdiskont). The daily money rates were c.$\frac{1}{10}$ lower during 1909-1913 *23, but I lack year-by-year estimates.

3.3.2. To deal with the earlier period first. Price data for undated bonds of the Reich are printed in the Stat. Jahrbücher. Before we can estimate the expected holding period yields which these prices imply, we must specify the holders' probable expectations about selling prices. We can attempt this either by examination of the relationship between the prices of bonds of different coupons or by application of the type of error-learning expectational hypothesis commonly used in economics.

Firstly, then, the relationship between the prices of bonds bearing different coupons. In the period 1909-1913 Reich undated bonds with 3%, 3½% and 4% coupons circulated together *24. Their average prices and

*21 This reversal also occurred in the USA. See Historical Statistics of the USA pp 654, 656.

*22 See Table 1b p 20 . For a discussion of these rates see F Döring op.cit. pp 403-8.

*23 Ibid. loc.cit. *22.

*24 St.Jb.f.d.Dt.R. price quotations date from 1887. 3½% bonds are quoted throughout the period; 4% bonds before 1892 and after 1909; 3% after 1892. Market discount rates are recorded from 1896.

current yields (which I define as coupon value divided by price) were as follows:

Table 1 Average Price and Current Yield* of Reich Bonds also Average Short Term Rates 1909-1913

	Bonds			Market Discount	Daily Money
Coupon	3%	3½%	4%		
Average Price	82.3	91.7	101.5	-	-
Average Current Yield	3.65	3.82	3.94	3.80	3.39

* Coupon Value Divided by Price

SOURCE St.Jb.f.d.Dt.R. 1909 pp 264-6; 1914 pp 294-6.

Imagine to start with that all investors shared identical and definite expectations of future bond prices. Then it seems plausible to state that the three different coupon classes of Reich bonds, being identical in all other respects, would be perfect substitutes and that investors would share identical expectations as to the yield from holding each. The prices of such bonds will always move in the same direction, but they seldom move far above parity *25. So the common expected holding period yield cannot greatly exceed 3.94% - the current yield on 4% bonds. Indeed it is likely to have been less. The expectation of price appreciation (implied by a 3.94% yield on 3% and 3½% bonds) entails the expectation that lower coupon bonds will reach parity; at which point higher coupons are liable to be converted to lower. If the conversion price is parity, then the holders of 4% bonds must expect

*25 For the following argument cf. E Wolfgang, Die Kursbildung ... pp 82ff.

some capital loss at the current price. Given definite expectations, and the prices overleaf, an expected yield of 3.95% is consistent with the expectation that 3½% bonds will reach parity in 25 years, and hence at that time conversion of 4% bonds to 3½% be possible; and that 3% bonds reach parity in c.35 years. But of course expectations were uncertain. Since higher coupons are liable to conversion to lower, but the converse almost never occurs, we can infer (assuming bond holders are risk averters) that the mean expectation of the market was for stable future prices, but that it allowed a 'risk premium' on higher coupons for the ever-present (albeit slight) risk of conversion *26. Broadly speaking, this implies that, over 25 years or so, mean expected yields were below 3.94%, and probably below the 3½% bond current yield of 3.82% but above the 3% bond current yield of 3.65% *27. The mean expected holding period yield was then close to the market discount rate but above the daily money rate. Thus the 'informed guess' about pre-war yields from analysis of the prices of bonds of different coupons suggests that they did not differ significantly from bill rates (market discount).

*26 The holder of a 4% bond converted at parity to 3½% will thereafter be in a worse position than someone who bought a 3½% bond at less than parity in the first place.

*27 Under uncertain expectations, the different coupon classes are imperfect substitutes, because each is subject to a different probability of conversion. Hence if investors are risk-averters, the 3% bond probably enjoyed a higher price than it would have done, had all classes been guaranteed free of conversion risk. The stock of 3%s was relatively small.

For the second approach to this question I follow Wolfgang and others, and treat the 3½% bond as the 'standard' bond *28. I deal with a holding period of 10 years. A longer period would unduly reduce the number of observations; a shorter seems unreasonable. Price and market discount data follow in Table 2.

Table 2a Prices of 3½% Bonds 1887-1913

Year	Bond Price	Year	Bond Price	Year	Bond Price
1887	102.1	1896	104.6	1905	101.3
1888	102.5	1897	103.6	1906	99.5
1889	103.7	1898	102.6	1907	94.7
1890	100.4	1899	99.8	1908	92.6
1891	98.4	1900	95.8	1909	95.2
1892	100.0	1901	99.5	1910	93.2
1893	100.4	1902	102.1	1911	93.3
1894	102.4	1903	102.3	1912	89.8
1895	104.4	1904	101.4	1913	85.8

Table 2b Average Yields on 3½% Bonds over 10 Year Holding Periods, and Average Market Discount Rate

Period	10 Year 3½% Bond Yields		Average Market Discount
	Expected	Realised	
1896/03	3.48	-	3.36
1906/13	4.10	2.40	3.99

NOTE The bond yields are to be read as the average of the 10 year yields expected/realised in each year of the noted period. For method of obtaining expected yields, see text.

SOURCE St.Jb.f.d.Dt.R. 1892, pp 128,131; 1897, pp 138,140; 1901, pp 150; 1909, pp 264-6; 1914, pp 294,296.

*28 E Wolfgang, Die Kursbildung ... pp 157ff; Centralverband ... Materialien ... pp 18-19.

I hypothesise that the expected selling price after 10 years was determined by the following crude distributed lag:

$$(3/1) \quad E(P)_{t+10} = 0.19P_t + 0.17P_{t-1} + 0.15P_{t-2} + \ldots$$
$$\ldots 0.03P_{t-8} + 0.01P_{t-9}$$

where P_t = selling price in year t;

$E(P)_t$ = expected selling price in year t.

In Table 2b we see the average value of the holding period yield *29 implied by this expression, for each of two periods - 1896-1903 and 1906-1913. It is higher in the second period because of the secular price fall (See Table 2a). But this also means that the yield actually realised in 1906/13 on bonds bought 10 years earlier was much less than that predicted by this hypothesis - 2.4% as against 3.48%. It seems plausible that consistent disappointment of expectations (ie persistent failure of prices to return to earlier levels) would promote a downward revision of expectations. Suppose that, instead of (3/1) above, holders expected selling prices to be the same as current prices. For simplicity, I calculated expected and realised one-year yields on this hypothesis:

$$(3/2) \quad E(P)_{t+1} = P_t$$

Taking 10-year moving averages, I find that up to the decade 1895/1904 expectations are broadly realised. Thereafter the gap widens progressively, until the average one-year expectation in the decade

*29 The definition of holding period yield is given in *20.

1903/1912 of 3.62% is matched by the realisation in 1904/13 of 1.92%. Thus even hypothesis (3/2) would exaggerate 'true' realisations over an extended period, and hence probably be subjected to downward revision.

Both from an analysis of the 'logic' of the relationship between prices of bonds bearing different coupons, and of the 'logic' of error-learning hypotheses about the formation of expectations, it seems fair to conclude that mean expected bond yields were no higher than the observed market rates of discount, but somewhat above daily money rates.

3.3.3. In the period after the stabilisation we have to use, as 'standard' bonds, the gold mortgage bonds of first class credit institutions, in place of the hardly-existent bonds of the Reich *30. Because of the simultaneous circulation of such bonds bearing a wide variety of coupons (10%, 8%, 7%, 6%, 5%), we can analyse the 'logic' of their price relationships, and reach fairly definite conclusions about expected future prices. But, because of the (presumably perceived) irrelevance of the experience of the decade 1914-24, and the great fluctuations in bond prices thereafter, it would be hard to specify expectations on the basis of an error-learning model.

*30 Thus following contemporary practice. See refs. in *28.

Table 3 Price and Current Yield* of Gold Mortgage Bonds bearing Different Coupons 1925-29

Coupon		10%	8%	7%	6%	5%
1925	Price	93.7	84.6	81.2	72.8	64.5
	CY*	10.67	9.46	8.62	8.24	7.75
1926	Price	103.0	96.6	91.7	87.3	80.9
	CY*	9.71	8.28	7.64	6.87	6.18
1927	Price	105.1	101.1	98.8	95.2	87.5
	CY*	9.51	7.91	7.09	6.30	5.71
1928	Price	104	97.2	90.1	86.4	80.7
	CY*	9.62	8.23	7.77	6.94	6.20
1929	Price	102	94.4	84.9	82.1	78.3
	CY*	9.80	8.47	8.25	7.30	6.37

*CY = Current Yield; ie coupon value divided by price.

SOURCE Stat.Jb.f.d.Dt.R. 1928 p 438; E Wolfgang Die Kursbildung ... p 91; Konj.Stat.Hdb.(1936) p 119; Vjh.Konj.forsch 1930 H1A p 23; H1B p 48; H2B p 56; H4B p 50; 1931 H1B p 49.

Let us imagine again that investors shared identical and definite expectations about future bond prices, and therefore that expected holding period yields of bonds of all coupons were identical. Assuming that their respective prices always move in the same direction, then, if we exclude the possibility of conversion, the expected 'true' yields must lie outside the extreme current yields shown in Table 3; eg for 1925, above 10.67% or below 7.75%. The latter value could only be expected if the prices of higher coupon bonds were expected to fall faster than the prices of lower ones. This however is contrary to experience *31. But if expected yield exceeds 10.67% then it can be

*31 E Wolfgang, Die Kursbildung ... pp 82-91. The prices of lower coupon bonds generally fall and rise faster than those of higher ones.

shown that lower coupon bond prices are also expected to exceed higher coupon bond prices after 6-7 years. This is illogical. Hence the pattern observed in Table 3 is only consistent with the expectation of conversion *32.

Identical expected holding period yields, such as to satisfy the following criteria, were obtained by trial and error *33 for bonds of all coupons, for each of the years 1925-29;

a) Bonds which at the end of the period have identical coupons should be expected to sell at roughly the same price. Bonds with higher coupons should be expected to sell at higher prices than those with lower coupons.

b) If a bond of coupon value 'x' is expected to have been converted to value 'y' within a given holding period, then it must also be expected that bonds of coupon 'y' will have reached parity within that period *34.

Calculations were made in respect of two holding periods - 10 and 15 years. The results are shown in Table 4, together with the average of

*32 This agrees with the construction put upon the data by E Wolfgang, 'Der Neuaufbau ...' p 89. Conversions of 10% bonds seem to have occurred: F Döring op.cit. p 397.

*33 By application of the formula in *20. Where conversion was deemed expected after m years, then for years t to m, C was given original coupon value; for years m+1 to end of period, or next conversion, the converted value; thus implying conversion at year-ends, and at parity.

*34 Whereas my results present a constant expected annual yield throughout the holding period, this is best regarded as an 'average' of a set of constantly changing (in this case, declining) expected yields. Thus eg if we consider yields in 1926 (Table 4) then 8% bonds must have been expected to reach parity by year 4 (implying an expected yield of 9% in the first 4 years) and 6% bonds to reach parity by year 6 (implying an expected yield of 8½% in the first 6 years).

Table 4 Expected Bond Yields consistent with the Price Pattern in Table 3; and Average Short Term Rates 1925-29

Year	Short Rate	Holding Period	Bond Yield	Price at end of Period 10%	8%	7%	6%	5%
1925	9.13	10	10.10	(103.4)	(99.4)	100.4	94.4	88.7
		15	9.50	(106.8)	(101.3)	103.0	100.0	98.9
1926	5.52	10	8.0	(101.2)	(101.7)	(99.8)	101.6	102.3
		15	7.25	(100.0)	(101.0)	(101.0)	(100.6)	103.1
1927	6.29	10	6.75	(100.0)	(99.9)	(100.0)	(101.0)	99.9
		15	6.40	(101.6)	(100.7)	(101.6)	(102.1)	101.9
1928	7.10	10	8.0	(101.9)	(101.5)	(97.4)	(100.6)	101.7
		15	7.25	(100.9)	(100.7)	(95.7)	(100.3)	102.3
1929	7.71	10	8.3	(102.1)	(100.6)	(90.9)	(96.2)	100.2
		15	7.50	(103.0)	(100.1)	(87.6)	(95.0)	100.9

NOTES: Prices in Parentheses are of bonds assumed to be bearing, at end of period, converted coupons, as follows:

1925: 10%, 8% bonds to 6% at end of year 5.

1926: 10% to 8% at end of year 4; 8%, 7% to 6% at end of year 6; 6% to 5% at end of year 11.

1927: 10% to 8% at end of year 2; 8%, 7% to 6% at end of year 4; 6% to 5% at end of year 11.

1928: 10% to 8% at end of year 4; 8%, 7% to 6% at end of year 7; 6% to 5% at end of year 9.

1929: 10% to 8% at end of year 4; 8%, 7% to 6% at end of year 7; 6% to 5% at end of year 8.

SOURCES: Bonds - Table 3 p 60 ; Short Rates: Table 1c p 20 .

the four short term interest rates *34A. These results are however predicated upon definite expectations. Under uncertainty, because conversions are only made to lower coupons, high coupon bond prices will be lower, and low coupon bond prices higher, than under certain conditions. Thus the estimated yields in Table 4 should not be biassed on this account.

From Table 4 it appears that:

i) Investors held strong expectations of conversions, commencing in the near future down to coupons below current normal issuing rates *35: ie they expected a speedy 'normalisation' of bond market conditions. Such expectations would significantly weaken the impact of Reichsbank manipulation of short rates upon long term rates, hence upon the cost of long term capital, since it failed to engender expectations of high future long rates. They also go a long way toward explaining the pronounced preference of borrowers for the issuing of short term debt.

ii) But despite the evidence of definite expectations of declines in long yields to levels generally below current short rates, expected bond

*34A From Table 4 it is clear that the 7% bonds were 'out of line' relative to other coupons in 1928 and 1929; likewise for 6%s in 1929. By hypothesising an alternative, speedier conversions of coupons, but the same bond yields, one can bring the 6%s and 7%s into alignment with the 5%s, but at the expense in both years, of knocking the 8%s and 10%s seriously 'out of line'. I do not know what special features attach to certain of these bonds to cause this. The variant actually shown in the Table was adopted a) because it minimised the 'out of line' observations, and b) because it specifies a conversion pattern less agreeable (ie less immediate) to the general hypothesis of the chapter, than that specified by the other variant.

*35 Only for a brief period in late 1926- early 1927 did issuing rates fall as low as 6%: DBZ 5.1.28, 'Der deutsche Kapitalmarkt im Jahre 1927'.

yields appear, at least for holding period of up to 10 years, to have exceeded average current short rates *36, whereas the 'pure expectations' theory would tend to predict the reverse under these circumstances *37. Another calculation, that of yields to maturity of newly issued domestic bonds (on assumed terms of 10 or 15 years), confirms this. See Table 5.

From my information it seems unlikely that average term to maturity would exceed 15 years *38. The estimates in Table 5 are subject to offsetting biasses. On the one hand they may be regarded as on the high side since they fail to allow for expectations of conversion; but on the other hand they are also on the low side for two reasons. Firstly in the post-war period redemption was usually at 101-105% of par. This is a minor factor. Secondly borrowers, especially from the public sector were chronically prone to overpricing their bond issues, hence suffering undersubscription *39. The effect of this in 1927 can be roughly quantified. About half of the non-mortgage bond issue in that year comprised the single Reich flotation in February (5%, issued at 92% of par) which failed and had to be converted to 6% in August *40.

*36 Alternatively they exceeded bill rates and daily money rates, but were usually below monthly money. Table 1a p 20

*37 Dodds and Ford op.cit. p 42.

*38 See below pp 70 .

*39 After mortgage bonds (excluded from the Table) the market was dominated by Public bonds. See E Wolfgang, 'Kritische Darstellung ... p 786; P Hertz, 'Reich und Reichsbetriebe ...' pp 536-7.

*40 See below pp 119 .

Had it originally been issued at 6%, the average 15-year yield to maturity on all 1927 bonds would have been 7.1%, not 6.2% as shown. Thus, I think we may regard the estimates of Table 5 as roughly 'right'.

Table 5 Yields to Maturity on Newly Issued Domestic Bonds (excluding Mortgage, and Undated Bonds) 1926-29

	1926	1927	1928	1929
Average Coupon Value	7.22	5.56	6.35	7.54
Average Price of Issue	94.2	93.8	94.4	96.6
Yield to Maturity*				
if Term = 10 years	8.1	6.4	7.1	8.1
if Term = 15 years	7.9	6.2	7.0	7.9
Adjusted Average Short Rates**	5.5	5.9	7.1	7.4

* Assuming Redemption at 100% of Par.
** The monthly average of the 4 short rates was weighted by the bond issue of that month.

SOURCE: St.Jb.f.d.Dt.R. 1930 p 369; Table 1a p 20 above.

Contemporaries held that bond yields exceeded short rates *41. This must have been so despite the smaller size of the long stock relative to the short, than pre-war, and despite definite expectations of falling future yields (and hence, presumably of future short rates at the 'low' end of the recently experienced range). Hence it can only be explained from the demand side, on the hypothesis of a change in the types of

*41 E Wolfgang, Die Kursbildung ... pp 27ff; followed by Centralverband ... Materialien ... pp 18,19,35; also J Barais, article cit. *60 below. Their proof takes no explicit account of capital gains/losses however.

asset holders ('preferred habitat' theory), or of a shift in the preferences of existing asset holders.

Little can be said definitely about changes in the type of asset holder. Contemporary, and subsequent belief in the disappearance of the 'rentier' cannot be validated simply by reference to the expropriation wrought by the inflation; some mechanism to explain why such people and institutions were not avidly rebuilding their portfolios must also be specified - eg changes in the income distribution. Adequate data is lacking for the pursuit of this type of explanation *42.

What about foreign influence on the demand structure? The term structure seems to have altered similarly in the USA and the UK too; see Table 6. For the UK, Howson has recently explained this as a consequence of government funding operations, ie a relative increase in the quantity of long term debt *43. I know of no explanation of the shift in the US structure. The relevance of these foreign changes for Germany is however doubtful. Before 1913 her chief link with world financial markets was presumably London. After 1924, definitely New York. The relevant comparison is therefore London pre-1913 with New York post-1924, and between these two the term structure seems to have altered little.

*42 F W Henning, Das Industrialisierte Deutschland, remarks (p 82) that the bulk of war loans was subscribed by only 4000 subscribers. However, F Hartmann, 'Die Verhältnisse ...' pp 46-7, and W Prion, 'Die Organisation ...' pp 349-53, believe that long-period bond holding had diminished.
See also K Borchardt, 'Wachstum ...' p 690.

*43 S Howson, Domestic Monetary Management ... pp 47-54.

Table 6 Long and Short Rates in the UK and USA: 1899-1929

A. UK	1900-13	1920-29	1925-29
Yield on Consols	2.98	4.63	4.54
Rate on 3-Month Bank Bills	3.26	4.28	4.50

B. USA	1900-14	1919-29	1926-29
Yields on Municipal High Grade Bonds	3.68	4.33	4.10
Short Rates (i)*	4.51	5.31	5.26
(ii)*	5.55	5.12	4.83

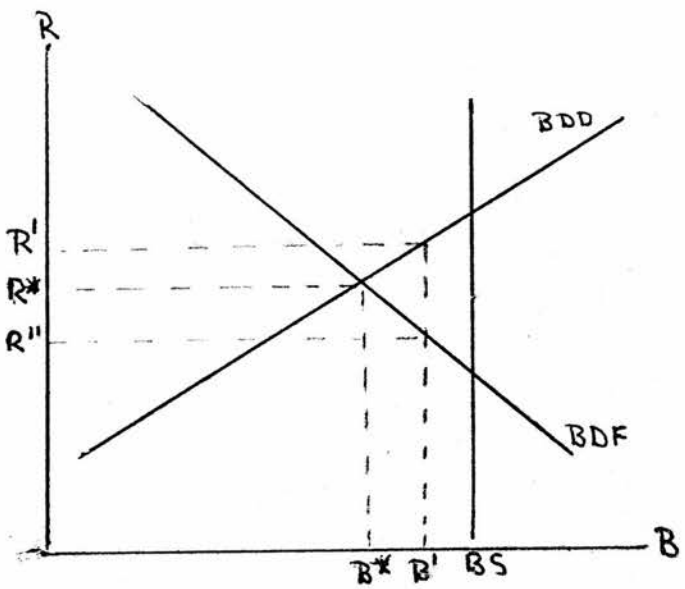
* (i) = Average of Prime Commercial Paper 4-6 months; Stock Exchange 90-day loans and Stock Exchange Call Money.
(ii) = Prime Commercial Paper 4-6 months only.

SOURCES: USA: Historical Statistics of the USA pp 654, 656.
UK: B R Mitchell and P Deane, Abstract ... pp 455, 460.

A second foreign influence on the German term structure might be inferred from the fact that the long term capital inflow was more strictly controlled than the short term. Such an argument would presuppose imperfect substitutability between long and short debt, so that, were both forms of inflow uncontrolled, Germans would hold relatively less long term debt, at a higher price. The relevant comparison here however is with the proportions of the pre-war portfolio, not with a counterfactual contemporary distribution. Even under the existing controls, it has already been shown that the domestically held bond stock was smaller, relative to the domestically held short term debt stock, than it had been in 1913 (given the great fall in the size of the former) *44.

*44 In any case this effect would be offset by foreign holdings of domestically quoted stock, believed by contemporaries to have been accentuated by the restrictions (eg Dec'26-Jan '27)

Even if the above argument be not accepted, it is unlikely that the actual effect of having removed controls would have been to eliminate the observed term structure. The effect is depicted in diagram 3/I:



R = Bond Yield

BS = exogenous supply of bonds (measured from O)

BDD = domestic demand schedule (measured from O)

BDF = foreign demand schedule (measured from BS).

Diagram 3/I

In an uncontrolled market, domestic bond holders would hold OB* of the bond stock; foreigners B*BS and the market-clearing ~~price~~ yield be R*. But controls limit foreign holdings to B'BS; hence the yield on foreign-held German bonds is R"; that on the domestic-held stock is R'. The effect of removing the controls clearly depends on a) the size of the gap R'-R" *45, and b) the relative elasticities of foreign and domestic demand (ie the slopes of BDF and BDD); c) the effect of reduced supply of German short term debt on domestic short rates. It

*45 This is consistent with the view of F Eicher, 'Auslandskredit und Beratungsstelle ...' pp 670-9, that there was little difference between the yields of domestically and foreign issued German bonds, after taking into account stipulations other than coupon, price of issue, and maturity. This view is shared by F Döring op.cit. p 399-400. (Both articles in K Liehl op.cit.)

is unlikely that the observed bond-bill gap would have been reversed, at least after mid-1926, because never thereafter were the yields on German foreign bonds below German bill rates. See Table 7 *45A.

Table 7 Yields to Maturity of New German Bonds Floated Abroad

	1924/5	1925/6	1926/7	1927/8	1928/9
Average Coupon Value	6.89	6.74	6.06	6.20	6.48
Average Price of Issue	93.8	95.7	96.4	93.2	94.5
Yields to Maturity*					
if average term = 10 years	7.8	7.3	6.5	7.2	7.3
if average term = 15 years	7.6	7.2	6.2	7.0	7.1
Adjusted Average German Short Rate		8.3	5.3	7.0	7.0

NOTES: (1) I assume that the period in question is the financial year 1.4. - 31.3.
(2) For other notes see Table 5 p 3/19. The yields in this Table are subject to the same qualifications as discussed in the Text describing that Table.

SOURCES: St.Jb.f.d.Dt.R. 1930 p 369; Table 1a p 20 above.

To explain the exhibited term structure, given the change in the maturity distribution and the evidence about investors' expectations, we are left, then, with the hypothesis of a shift in the preferences of asset holders. Specifically, that investors superimposed liquidity or risk premia on strong expectations of future bond yield decline. Believing that, in the normal course, interest rates would fall toward pre-war

*45A The foreign issue of mortgage bonds was more severely controlled than that of any other type; hence the use of this type as a 'standard' bond may import upward bias into the yield estimates. But there seems, on other grounds, to have been an offsetting rise in domestic preference for this, relative to other bond types, thus nullifying the objection. For full discussion see pp 121ff below.

levels, but, given the uncertainty of the recent past, being also apprehensive of events which might rob bonds of <u>all</u> value, investors demanded in effect very high compensation in the short run for the probable reduction in longer term yields *46. Contemporary circumstances and comment abundantly confirm that bond holding was viewed as a risky occupation. The fact that all bonds (save only those of the Reich) were denominated in fine gold betrays this right away *47. Equally, the impossibility, except in the case of first-class mortgage bonds, of selling very long-dated debt speaks the same message *48. A third pointer in the same direction is the lowness of the share price-earnings ratio - and this although the equity market itself was flourishing only in the brief periods autumn 1924 - February 1925, and summer 1926 - May 1927. Table 8, though doubtless rough, seems to

*46 That even over 15 years expected bond yields exceeded expected yields from short term investments can be suggested thus: Suppose in 1927 an investor expected to be able to buy and sell at par a succession of 1-year bonds bearing coupon values of 6.3% (the 1927 average short rate) in years 1-4, 6.0% in years 5-10, and 5.0% in years 11-15 (following the conversion expectations implicit in Table 4). Then his 15-year yield would be 5.8%; whereas the corresponding bond yield is 6.4%.

*47 But would not eliminate fears: inflation and other threats to bond values need not be accompanied by legal devaluation. Foreigners often demanded a gold clause in addition to denomination in their own currency!

*48 Mortgage bonds benefited from their real estate backing and their favourable revaluation. See p 123 below. On the difficulties of selling long-dated bonds see A Jamin, 'Bayerische Kreditpolitik' pp 705ff, K Saenger, 'Die Entwicklung der Preussischen Staatsschulden', pp 688-93. From these it seems that the <u>average</u> term of state bonds was 12-15 years (amortisation being spread over some years). The Reich had to be content with 20 years. The amortisation of municipal bonds was <u>completed</u> pre-war in c.44 years; post-stabilisation in c.20-24 years. E Wolfgang, 'Kritische Darstellung ...' pp 787ff.

confirm the preference for ownership rather than debt rights *49.

Table 8 Equity Price-Earnings Ratios and Current Bond Yields
(both excluding expected capital gains/losses)

	1900-1908		1926-1929	
	Equity Ratio	Bond Yield	Equity Ratio	Bond Yield
Max.	5.84	3.81	6.50	8.0
Min.	4.51	3.51	3.33	6.4
Mean	5.22	3.62	4.83	7.23

METHOD: Current dividend/coupon value divided by price.

DATA Pre-war: Shares: leading industrial, banking, shipping.
Bonds: 5 each of state, municipal, mortgage; all 3½%.

Post-war: Shares: the comprehensive Stat.Reichsamt index.
Bonds: Table 4 p 3/17 above.

SOURCE: E Wolfgang, Die Kursbildung ... pp 51-2; Table 4 p 3/17 above.

A fourth pointer, in this case common to bonds and equity, is fragility of the stock market. Contemporary reports are replete with comments about its 'thinness' *50. This could be both cause and effect of the depression and variability of prices *51. The point can perhaps be quantified by comparing the effect on market turnover of the German and US stock market crashes:

*49 Other influence are doubtless relevant: 'insider' knowledge; better capital appreciation prospects. The larger size of the equity relative to the debt stock would work the other way. See E Mosler, 'Fragen des Aktienwesens' pp 77-8; W Prion, Die Preisbildung an der Effektenbörse pp 243ff. F Döring op.cit. pp 391-2, and D Petzina, Die Deutsche Wirtschaft ... p 94 seem to me to present a confused discussion of this relationship.

*50 See above pp 29, 41. Also Centralverband ... Materialien ... pp 90ff, 'Die Bedeutung der Börsenorganisation'.

*51 Cf. Paul Davison op.cit. pp 63ff, 264.

Table 9 Stock Market Turnover in Germany and the USA

	Germany (mill Rm per month)		USA ($bill p.a.)
July '26 - June '27	102	1929	4.11
July '27 - June '28	52	1930	3.6
1926 + 1927	73	1928+1929	4.0
1928 + 1929	46	1930+1931	3.6

SOURCES: Germany: Konj.Stat.Hdb. (1936) p 115; derived from Stock Exchange Turnover Tax.
USA: Historical Statistics of the USA, p 659.

The much severer reduction in Germany than in the USA suggests that the power of Dr Schacht to break the market rested largely upon the ease with which he frightened investors off, because of their inherent nervousness *52.

A fifth pointer is to be found in the evidence, cited by Hardach and others, of the abnormally high rate of capital export from Germany, despite the (apparent) negative yield gap thus incurred *53.

A sixth pointer to the existence of risk/liquidity premia lies in the fact that even in 1935 the general state-sponsored conversion of bonds from the hitherto normal coupon of 6% to 4½% could only be effectuated by very considerable coercion of financial institutions, inducements, by closing the market to new issues for months before the operation,

*52 The stock market collapse of Feb.1925 had identical consequences on turnover, which in this case built up again from early 1926. Konj.Stat.Hdb.(1936) p 115. The 'thinness' of the market also reduces the liquidity of bond-holders both ex ante and ex post. See G Bernhard, 'Die Liquiditatsstörungen ... pp 336-9.

*53 G Hardach, Weltmarktorientierung ... pp 71. Also K Diehl, 'Ursachen des hohen Zinsfusses' pp 875ff; or E-A 1/6 Die Deutsche Zahlungsbilanz p 136.

and so on *54. In the same vein I note the ample evidence of the weakness of the German bond market after 1948 (ie after another inflation) *55.

Finally I come to contemporary comment. One of the main testimonies to contemporary concern about high interest rates is the 1932 symposium edited by Karl Diehl. In his own contribution he analyses the causes of high rates. After reviewing theories he rejects, such as those blaming the inadequate supply, or distribution of gold, or those ascribing to Germany a high marginal efficiency of capital *56, and the theories he partly accepts, such as those blaming inadequate savings and high wages, finally, as the most basic of explanations, he states that interest rates are high because of the abnormally large risk premia they contain *57. These he relates especially to the political uncertainties attendant on the reparations issue *57.
Other contributors also stress perceived risk, relating it rather to the aftermath of the inflation. Amongst these the introduction to W Hartmann's contribution deserves translation in extenso:

*54 6% became the standard coupon rate after the decree reducing interest rates in 1931. (This of course would not help confidence). For details of the 1935 conversion see K E Poole German Financial Policies 1932-39 p 165-6; R Stucken op.cit. p 145 esteems the conversion a 'complete success', in which the 'national discipline of the population was decisive; but adds in parentheses "man weiss, dass diese Haltung nicht ganz freiwillig war"! See also J J Klein, 'German Money and Prices 1923-44' pp 156-7.

*55 H Menderhausen, Two Post-War Recoveries in Germany pp 75-7,115ff; H C Wallich, The Mainsprings of German Revival, pp 166, 184-192; R Stucken, op.cit. pp 232-241, esp. 235-6.

*56 The theory of J W Angell, The Recovery of Germany pp 211-5.

*57 K Diehl, 'Ursachen des hohen Zinsfusses', in K Diehl (ed), Wirkungen und Ursachen des hohen Zinsfusses in Deutschland, pp 833ff, esp. pp 914-9.

"[sc. Under post-stabilisation conditions] the natural selection of debtors is effected not merely according to the rate of return these are able to offer the investor; the predominance of the risk element causes the selection to be effected rather from the point of view of the greatest possible security for the capital that is lent. The intensified 'weeding out' of debtors which high interest rates (high because of the risk element) naturally cause, is effectuated by means of:

(i) a replacement of long term by medium and short term credit, and
(ii) a replacement of unsecured by secured credit.

The inclination of capital to long term placement presupposes a certain foresee-ability (Übersehbarkeit) of the development of the status of the debtor, or debtor country, over the term of the loan. Such a 'foresee-ability' has not infrequently since the war been totally lacking in German conditions. One remembers the time of the occupation of the Ruhr... In later times also capital for long term placement has dried up almost completely. That occurred for example in the last two-thirds of 1929 as a result of the Paris negotiations ...

But even outwith these crisis periods ... there existed in Germany, and exists today (early 1931 - TB) a general aversion from long term placement (eine allgemeine Scheu vor fester, langfristiger Kapitals-anlage in Deutschland). Despite the attraction of high interest rates in the capital market, many investors preferred to deposit their capital at lower rates with banks and giral clearing associations (but immediately at their disposal), rather than tie them up for years in long term assets ... These considerations explain the strange state of affairs described by Oskar Wassermann at this year's general meeting of the Deutsche Bank und Diskontogesellschaft, that "to some extent types of business were financed with these moneys (ie daily and monthly stock market money) whose financing would normally have been the job of the bond and equity market (Kapitalmarkt) and that, owing to the influx of money to the money market, bank credit, which in normal times has to be the dearest form of credit ... has become the cheapest, so that there exists no incentive to consolidate bank credit through taking up mortgages or other types of long term loans ..." *58.

*58 W Hartmann, 'Wie wirkt sich der hohe Kapitalzinsfuss auf Auflese und Sicherheit im Immobiliarkreditwesen?' p 439. He proceeds to explain by contrast the rather better status of real estate debt. Like many contemporaries he seems not fully to weigh the fact that bond holding can be quite a liquid investment in a well-functioning stock market.

Other contributors make the same point: F Neumark (in connection with the failure of the Hilferding loan of 1929); F Eicher (on foreign flotations); K Saenger (on Prussian bonds) *59. The same point is found not infrequently in other works *60. I also note evidence that the same uncertainty dictated banking policy *61.

Thus I conclude, from behavioural analysis and from contemporary comment, that the bond market was characterised both by strong expectations of future decline in yields, and by strong liquidity preference.

*59 F Neumark, 'Der öffentliche Haushalt unter Einwirkung der Kreditschwierigkeiten p 584; also P Hertz op.cit. p 517. For Eicher, see footnotes *45 and *65. K Saenger op.cit. pp 688-93. The effective coupon on the Hilferding loan was 10-12%!

*60 J Barais, 'Zins und Konjunktur', in Wk 9(1930) pp 302ff:

"Der ungewöhnlich grosse Unterschied zwischen den Zinssätzen für langfristige und kurzfristige Gelder ist immer ein Zeichen dafür, dass das Vertrauen in die Wirtschaft schwer erschuttert ist; selbst die hohen Zinssätze ... vermögen nicht, Gelder von der verhältnissmässig risikolosen kurzfristigen Anlage in eine langfristige Anlage mit hoheren Risiko umzulenken. Nur so ist erklärlich, dass zur selben Zeit wo sich die Tagesgeldsätze um 1½ bis 2% bewegen, die Kosten einer erststelligen Hypothek noch immer ca. 9% ausmachen" (p 307). Also F Hartmann op.cit. p 50, "An Stelle der kontinuierlichen Aufnahmefähigkeit des deutschen Kapitalmarktes [sc. 'vor dem Krieg'] bestand eine ausgesprochene Kapitalarmut und eine starke Scheu, sich in typische langfristige Anlagen festzulegen". Or K E Poole op.cit. pp 189-90, "It was difficult [sc. 'in the early 1930s'] to find those who were willing to lend at long term".

*61 K Diehl, 'Ursachen ...' p 897, "Auch hier [sc. 'in connection with the gap between bank lending and borrowing rates'] spielt die Risikoprämie, ... eine wichtige Rolle". Cf. H Rummel, 'Wie wirkt sich die Kostenelemente im Zinssatz aus?' p 438.

3.4. Summary: A Simple Model of the Financial Markets

Neither of the two 'extreme' theories of interest rate determination described on p 47 above is sufficient to account for the observed behaviour of the bond and money markets. On the one hand the importance of the Reichsbank policy in maintaining high short rates 1924-29 cannot be doubted - both directly, in discount policy, and indirectly, in encouraging German dependence on dear foreign deposits. But the Reichsbank could not operate in long term markets. Hence its ability to affect bond yields depended on how far it could alter the maturity distribution of the interest bearing debt, or affect expected future short rates. It affected neither significantly; and a detailed argument showed that high bond yields are best explained by enlarged liquidity premia, owing to increased uncertainty.

There is a complex interaction between long and short rates, as between these and the supply and demand for money. I wish to conclude by distilling what seem to me to be the salient features into a very simple model of financial markets.

In this model there are only three financial assets: bonds, bills and money. Let -

Ms, Md	be supply of and demand for money
r, r_f	be domestic and foreign bill rate
F	be the net supply of foreign short term credit (ie bills)
BDD, BDF	be domestic and foreign demand to hold German bonds
BS	be the stock of German bonds
R, R_f	be the yield on domestic and foreign bonds
NBdD, NBdF	be domestic and foreign demand for new German bonds
NBs	be the supply of new German bonds
Rn	be the yield on new German bonds
Bexp	be the net export of bonds
Y	be aggregate income at current prices
Po	be a policy variable
U	be a scale which is an increasing function of the degree of uncertainty.

Then I specify the following relationships:

(3/1) $Md = Md(Y,r,U)$ $\quad Md'(Y),\ Md'(U) > 0;\ \ Md'(r) < 0$

The demand for money is an increasing function of the level of income and the level of uncertainty, and a decreasing function of the bill rate.

(3/2) $Ms = Ms(Po,r)$ $\quad Ms'(r) > 0$

The supply of money is an increasing function of the bill rate, and a function of policy decisions.

(3/3) $Md = Ms$ The money market must clear.

(3/4) $r_f = \overline{r_f}$ Foreign bill rates are constant.

(3/5) $F = F(r,$ $\quad F'(r) > 0$

The excess supply of foreign short term credit is an increasing function of the bill rate.

(3/6) $BDD = BDD(R,r,U)$ $\quad BDD'(R) > 0;\ \ BDD'(r),\ BDD'(U) < 0$

The domestic demand for holding bonds is an increasing function of their yield, and a decreasing function of bill rate and of the degree of uncertainty.

(3/7) $R_f = \overline{R_f}$ Foreign bond yields are constant.

(3/8) $BDF = BDF(R,U)$ $\quad BDF'(R) > 0;\ \ BDF'(U) < 0$

Foreign demand for holding German bonds is an increasing function of their yield, and a decreasing function of the degree of uncertainty.

(3/9) $BS = \overline{BS}$ The size of the bond stock is exogenous (this is an obvious simplification)

(3/10) $BS = BDD + BDF$ The bond market must clear.

(3/11) $Rn = R$ The yields on new bonds equals that on the existing stock.

(3/12) $\frac{NBdD}{NBdF} = \frac{BDD}{BDF}$ Demand for new bonds is divided between home and abroad in the same proportions as is the existing stock.

(3/13) $NBs = NBdD + NBdF$ The market in new bonds clears.

(3/14) $Bexp = NBdF + \Delta BDF$ Bond exports equal foreign purchases of new German bonds plus net change in foreign holdings of the existing stock.

These relationships can be summarised in four simple diagrams:

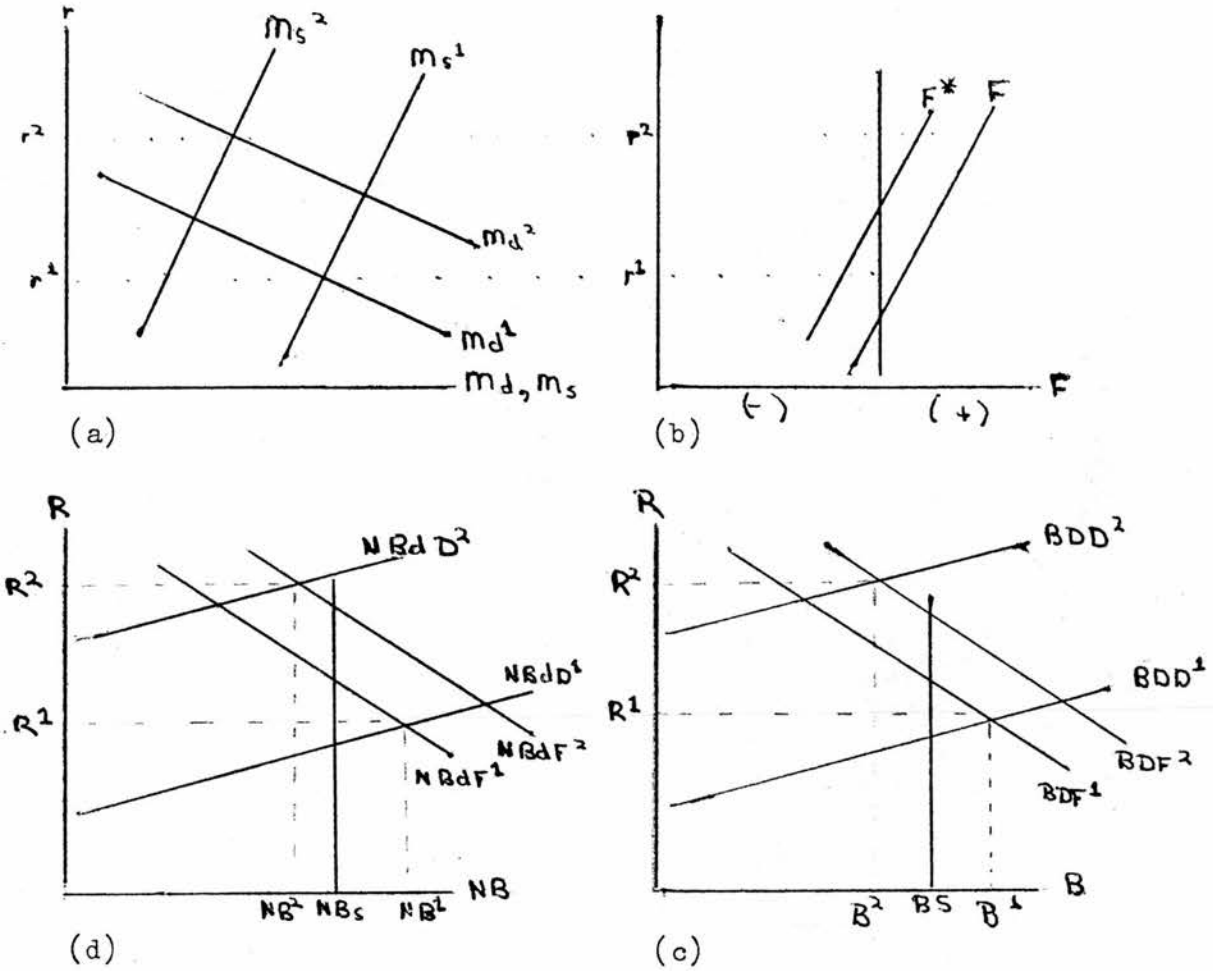


Diagram 3/II

Panel a/ reproduces in a familiar diagram the demand for and the supply of money, given the level of income and 'uncertainty'. Panel b shows the implications of the bill rate determined in panel a/ for the net inflow of foreign short credits. In both panels the superscript ^{1} refers to pre-1913, ^{2} to post-1924. Thus in both periods German bill rates created a short term net inflow *62, but this was

*62 E-A 1/6 Die deutsche Zahlungsbilanz pp 130ff.

very much larger in the second, the higher bill rates being the result of an enlarged demand for money (at given income levels) owing to greater uncertainty, and of reduced supply, owing to Reichsbank policy. Moreover, as the period advanced, the level of bill rate required to sustain a given rate of inflow of short term credit increased, owing to the growing dependence of the German money supply on this foreign base - ie, in panel b), F shifted to F*.

Panel c), describing the bond market, is a simplified version of that diagram already met on p 68 . BDF^1 - the pre-1913 foreign demand schedule for German bonds - represents 'negative' foreign demand to the right of BS, ie <u>supply</u> of <u>foreign</u> bonds. At the pre-1913 equilibrium of B^1R^1, German hold (in a 'net' sense) the entire domestic stock (BS), and BSB^1 of foreign bonds in addition. After 1924 the domestic bond demand schedule - BDD^2 - has shifted up, mainly because of increased uncertainty, but partly also because of high bill rates. Presumably foreign demand for German bonds has shifted up also but evidently not so much. This may be for some or all of the following reasons:

(i) German bill rates were higher than abroad, largely because of Reichsbank policy. Thus, to the (small) extent that high German bond yields reflected a 'sympathetic' rise with bill rates, the attractiveness of German bonds to foreigners will have increased, relative to pre-war. Given that this 'sympathetic' movement was slight however (as argued in this chapter) this reason seems insufficient to explain such observations as that 70% of the German private bond stock issued between 1924-29 was issued abroad *64.

*64 Cf. <u>Wi.und Stat.</u> 1930 p 386.

(ii) Foreign investors, having no immediate experience of the inflation, exhibited a lesser increase in 'uncertainty'.

(iii) Since a foreign investor would hold relatively fewer German bonds in his portfolio than would a German, and hence enjoy greater possibilities of risk diversification, his risk-aversion from German bonds would be less *65.

Because of these shifts in BDD and BDF, foreigners after 1924 hold (net) German bonds to B^2BS, and the equilibrium yield has risen to R^2 (I neglect here the impact of controls, analysed in Diagram 3/I above).

Panel d), representing the yields and distribution of purchases of new bonds, is a replica of Panel c), on the assumptions enbodied in expressions (3/11) to (3/13). But if the positions of BDD and BDF in Panel c) are changing relative to each other, then Panel d) does not represent net capital export. To obtain this one must add to the flow shown in Panel d) the net change in ownership of existing stock. See expression (3/14).

*65 Thus the high German bill rates probably played a bigger role in determining the distribution of bond holdings between home and abroad, than in determining actual yields. Witnesses differ as to the actual degree of foreign risk-aversion from German bonds. Wd 10/1(1925), 'Amerikanische Finanzierung ...', p 440 suggests it was not as great as German; on the other hand, F Eicher, op.cit. p 679: 'That lower foreign interest rates have hardly had any effect on German issues [sc. 'abroad'] is a sign of the level of risk premium which was brought into play ... by foreign investors. The prices of the German foreign loans have orientated themselves, not according to low interest rates abroad, but according to the high demands of the [sc. 'German'] borrowers.' As this implicitly concedes however, the actually observed yield is a function not only of risk premia etc., but also of foreign and domestic demand elasticities (slopes of BDD and BDF). And the very success of the Dawes Loan, when German domestic markets were still closed to new issues, suggests a speedier recovery of foreign than domestic confidence.

CHAPTER 4 FISCAL POLICY AND FISCAL STRUCTURE

4.1. Introduction

Important aspects of fiscal policy have already been described, notably by D Baumgarten *1. As a result, part of this chapter is only a resumé and assessment of this work. Other important aspects have required more original treatment.

The study of fiscal policy and structure may be defined for the purposes of this thesis in a two-fold manner. Firstly, as the study of the effects of the relationship between public expenditure and current revenues (as also, of their aggregate levels) on aggregate employment and output. Secondly, as the study of the effects of the methods of finance of the excess of expenditure over current revenues (and its converse) on the state of the financial markets.
The central indicator of the effects of fiscal policy - the government surplus or deficit - may be a clearly defined magnitude in elementary economic theory, but it is harder to distinguish empirically. In Weimar Germany, as in most places, the boundaries of government were not sharply defined.

*1 D Baumgarten, Deutsche Finanzpolitik 1924-1928.

Firstly, government was carried on at three (or four) levels - the Reich, the states (Länder) including the Hanse cities of North Germany, the provinces (in Prussia), and lastly the communes (Gemeinden) which for certain purposes, such as public utility provision, often united in communal associations (Gemeindeverbände). Where the term local authority is used, it will cover provinces and communes in general. In this chapter it is appropriate to define 'government' to include all these levels.

Secondly, the boundaries of government were much more indistinct in a lateral sense. That is, a significant proportion of industrial and commercial enterprise was owned, wholly or in part, by government at all these levels and was subject to varying degrees of governmental direction. The Reich controlled a bewildering variety of industrial concerns *2, the ownership of many of which was consolidated into a holding company - the Vereinigte Industrie-Aktiengesellschaften (Viag). The railways and the Post Office were run after 1924 as independent but Reich-owned enterprises. The Reich also had significant part interests *3. Prussia also owned an impressive array of firms, above all in heavy industry, eg the Preussische Bergwerks- und Hütten-gesellschaft in Silesia or the Hibernia and Recklinghausen coal mining concerns in the Ruhr; also considerable electricity interests, or

*2 Lists of the companies wholly or partly owned by the Reich at 1.7.27 and 1.7.29 are found in BA R2/1274. There seems to have been considerable expansion between the two dates.

*3 K Sautter, 'Der Kapital- und Zinsendienst der deutschen Reichspost p 316'; J Vogt, 'Wandlungen im deutschen Eisenbahnwesen'; an example of a part Reich-owned iron/steel works is Ilseder Hütte: W Treue, Die Geschichte der Ilseder Hütte, p 457.

part interests *4.

Other states were not without industrial interests. But much more important were the commercial and industrial interests of the communes. These included above all public utilities and transport undertakings, but also agriculture and forestry interests, market halls, slaughter-houses, port facilities, recreational facilities etc. Local authority revenues from such enterprises came to about one-tenth of their aggregate tax revenues *5. In addition to these, we must take into account the penumbra of credit institutions, ranging from 'state banks' like the Preussische Staatsbank, down to the municipal savings banks, and to institutions like the 'Preussenkasse' with a measure of public funding.

The relevant criterion for inclusion or exclusion of these manifold enterprises seems to be the degree to which their pricing, output and financing policies were dictated by commercial (ie, in the theory, 'profit maximising') objectives. As a broad principle it seems to be the case that enterprises of the Reich and Prussia were allowed considerable autonomy to pursue commercial objectives *6. They impinged on the fiscal structure strictly defined insofar as they transferred surpluses to, or received subsidies from government treasuries, and

*4 H J Winkler, Preussen als Unternehmer 1923-32; M Schulz-Briesen, Der Preussische Staatsbergbau im Wandel der Zeiten, vol 2.

*5 Wi.u.Stat. 1932 p 296. These estimates exclude income from agriculture, forestry and credit institutions. See too Stat. Reichsamt, Einzelschr ... no.15, Die kommunale Betriebe ... and O Büsch, Geschichte der Berliner Kommunalwirtschaft in der Weimarer Epoche pp 18ff.

*6 For Prussia, H J Winkler op.cit. chs. 3 and 4 passim.

this is captured in the budget statistics. At a communal level, it is far from clear that commercial objectives were pursued *7. Communal enterprises were operated either in commercial form (eg as A.G. or G.m.b.H.), or as actual communal departments ('in eigener Regie') *8. In the former case only the net transfer of funds to and from treasuries appears in budgetary statistics; in the latter, the gross operating account is in effect incorporated *9. This will probably be adequate, if not quite accurate from a theoretical point of view.

As far as publicly owned credit institutions are concerned, I shall treat transactions between these and the treasuries indistinguishably from transactions with the private banking sector, although this is arguably inaccurate, to the extent that the liabilities of these banks were public monies, and that their policies were dictated by fiscal pressure rather than banking objectives - as eg in the case of communal borrowing from the banks they owned, in the financial crisis after 1928 *10.

Finally, we must consider the status of the social insurance institutions

*7 O Busch op.cit. pp 23ff, 158ff; also pp 115-7 below. E-A III/2, Die deutsche Elektrizitätswirtschaft pp 59-61.

*8 By uniting estimates of the proportion of publicly sold electricity generated in communal plants (E-A III/2 op.cit. p 69) with estimates of the proportion of publicly sold electricity generated in communal plants 'in eigener Regie', (ibid. p 68), I infer that (by output) c.⅓ of communal power stations were 'in eigener Regie'. For other public utilities the proportion was probably higher.

*9 The 'cameralist' mode of bookkeeping also impeded the pursuit of commercial objectives in plants 'in eigener Regie': O Büsch op.cit. pp 6ff; Bankarchiv (1930/1) pp 209ff, 'Die Gestaltung des kommunalen Revisionswesens'; pp 65ff, 'Finanzielle Zwickmühle kommunaler Betriebe'.

*10 Wd 14/1(1929) p 1581, 'Die kommunale Verschuldung seit 1924'.

(Invalid and Dependents', Accident, Illness, Salary Earners'). These are excluded from the official budget statistics. Nevertheless, it seems clear they should appear. Throughout the quinquennium after 1924 these were rebuilding their assets by, presumably, an excess of contributions and government subsidy over outpayments. This would have, in fiscal terms, a deflationary impact *11. See Table 1.

Table 1a Reconstruction of Social Insurance Institutions (excl. Unemployment Insurance) Mill.M/Rm.

	1) Aggregate Assets	2) Annual Increase in Assets	3) Annual Surplus	4) Government Subsidies
1913/14	3160	-	-	-
1924/25	846	-	-	-
1925/26	1262	416	398	259
1926/27	1833	571	528	285
1927/28	2461	628	638	346
1928/29	3256	795	780	416
1929/30	4075	819	704	n.a.

NOTE: Annual Surplus: Crude Receipts minus Outpayments and Administrative Costs.

SOURCES: col 1) and 2): Hoffmann ... p 763.
col 3): St.Jb.f.d.Dt.R. 1928 p 479, 1929 p 375, 1930 p 417.
col 4): Stat.Reichsamt, Einzelschr ... no. 14, Die öffentliche Finanzwirtschaft ... p 89.

*11 Baumgarten op.cit. pp 169-72, 206-7, holds that Social Insurance surpluses had no fiscal significance since they were re-lent on the financial markets. Surely however one must distinguish the analysis of the fiscal balance from that of its financial repercussions.

Table 1b Income and Expenditure of the Reich Institute of Employment and Unemployment Insurance Mill.Rm.

	Contributions	Expenditure	Surplus (+)
1.10.27 - 31.12.27	196	146	+50
1928	851	941	-90
1929	890	1207	-377

NOTE: Expenditure = Outpayments and Admin. Costs. It excludes accumulation of assets.

SOURCE: St.Jb.f.d.Dt.R. 1929 p 375, 1930 p 416-7.

The second column of Table 1a indicates the deflationary impact. In assessing the overall surplus or deficit of the public household this item should be entered on the surplus side, the Reich subsidy on the deficit side.

Unemployment Insurance was only set up in October 1927, in the Reich Institute of Employment and Unemployment Insurance *12. Thus unemployment relief, which before them was disbursed in various forms by all levels of government, and appeared in full in the budget statistics, after 1927 appeared therein only in the form of subsidies to the above institute, and of the various types of supplementary relief still provided for those who failed to qualify for the insurance. Contributions paid to, and relief paid by the institute do not appear, hence neither does any net asset building by it. In practice the institute had hardly any time to accumulate assets before the slump was upon it, so we can assume that its expenditure overbalanced its

*12 Stat.Reichsamt, Einzelschr ... no 14, Die deutsche Finanzwirtschaft vor und nach dem Kriege, pp 19ff.

revenue by roughly the amount of the Reich subsidy; and that this subsidy itself captures the fiscal impact of the institute.

Before examining the evidence of fiscal policy we must ask who controlled it? Only about 60% of current government expenditure was undertaken directly by the Reich *14, and about 12% of government net capital expenditure *15. Did the Reich then exert effective fiscal control by its control of revenue? The Reich levied a larger proportion of taxes than it controlled of total expenditure - about two-thirds, reserving to itself all the most flexible taxes: the bulk of those left to lower levels of government were land and property taxes *16. The lower levels made good their revenue shortfall by tax transfers from the Reich (Steuerüberweisungen). Throughout the period the regulation of these transfers was a matter of controversy between the Reich and the states, and a provisional arrangement remained in force. By this the Reich transferred 75% of Income and Corporation Taxes and 33% of Turnover Tax to the states, who in turn transferred a proportion to the communes. In the end therefore the states and communes probably enjoyed a larger share of the proceeds of the cyclically sensitive taxes than the Reich (cf Table 4 p 94) *17. But given the

*14 Hoffmann ... pp 720-1.

*15 G Keiser and B Benning, Kapitalbildung und Investionen in der deutschen Volkswirtschaft 1924-28 p 158. One assumes the gross proportion was similar to the net.

*16 Baumgarten op.cit. p 218.

*17 K D Hansmeyer (ed) Kommunale Finanzpolitik in der Weimarer Republik pp 125-8; I Maurer, Reichsfinanzen und Grosse Koalition pp 18-19. The precise share-out varied from year to year: Stat.Reichsamt Einzelschr ... no 14 op.cit. pp 61-3.

sharing arrangement (Finanzausgleich), the government and parliament of the Reich shared the initiative in setting tax rates, in the main, and not the other levels of government. However, Reich control of the borrowing policies of lower levels of government was very much weaker. It had, till 1930, no effective control over the domestic borrowing policies of states and communes (the states having the control of communal borrowing *18). Foreign borrowing by the states and communes was controlled by the so-called Advisory Council for Foreign Credits (Beratungsstelle für Auslandskredite), in which the Reich, the states and the Reichsbank had roughly equal voices; it could hardly be called an organ of the Reich *19.

In seeking to ascertain the empirical counterpart of the 'theoretical' fiscal surplus/deficit, the 'crude' surplus/deficit of the official statistics requires certain adjustments. Baumgarten works in terms of 'domestically effective expenditure and revenue' *20. Domestically effective expenditure would exclude Reparations cash payments to the Agent-General. These would have no domestic fiscal demand-stimulating effect (though, pending their transfer abroad, would be re-lent on the money market). Reparations payments in kind, by contrast are to be included. He also excludes debt repayments to the Reichsbank and state banks, but includes those to private banks. This seems a dubious distinction, but is unimportant in practice.

*18 R Ott, Die Beratungsstelle fur Auslandskredite ... pp 93-4; K H Hansmeyer (ed) op.cit. pp 217-8.

*19 This is discussed on pp 104ff below.

*20 The following discussion is based on Baumgarten op.cit. pp 205-211.

On the revenue side, Baumgarten advocates the exclusion of appropriations from surpluses accumulated in previous years. But all duties levied for Reparations purposes (including eg the special 'obligations' on industry and railways) are included. Both decisions seem valid.

The analysis of the macro-economic impact of fiscal policy is undertaken with the implicit counterfactual of a feasible alternative fiscal policy; different expenditure programmes, different tax rates. Since the observed fiscal balance alters not only as a result of conscious policy, but also as a result of change in the level of economic activity, modern fiscal theory seeks to capture this counterfactual by analysing notional constant employment (usually full employment) surpluses/deficits *21. I lack the information necessary to construct such a measure. However the qualitative analysis here undertaken is well served by a simple examintion of change in expenditure policies, tax rates and the like. Analysis of change in the 'constant employment' fiscal balance ought also to be complemented by a disaggregated analysis of the types of policy change: eg it is often held that an expenditure increase is more expansionary than an equivalent cut in tax rates, and increase in some types of expenditure is more expansionary than in others. This type of analysis will scarcely be attempted here.

*21 For a textbook treatment see G Fromm and P Taubmann, Public Economic Theory and Policy, pp 204ff.

4.2. The Fiscal Balance of the Aggregate Public Household

The public financial year ran from 1st April; I shall follow this periodisation *22.

Only from 1925/26 is sufficient data available to construct a measure of the consolidated fiscal balance of the entire public household (ie all levels of government plus social insurance) *23. Estimates of this balance (as described and defined in the first section) for 1925/26 to 1928/29 can be taken directly from Baumgarten, with two adjustments: (i) the 'social insurance balance' has to be added, and (ii) I could not trace the source of his cash Reparations data, so, since I wished to extend the estimates to 1929/30, I replaced them by data available for the whole period in the Stat. Jahrbücher. Otherwise the estimates for 1929/30 can be constructed out of the Stat.Reichsamt series from which Baumgarten constructed his own estimates. The result is presented in Table 2 overleaf.

The measure of the fiscal balance in this Table fails to deduct from expenditure a) interest payments on public authority foreign borrowing, which Baumgarten estimates at c.50 mill.Rm. per year *24, and b) the cost of upkeep of diplomatic missions. At a guess, therefore, the estimated deficit in Table 2 line 7) should be reduced by a further c.100 mill. per annum.

*22 This is the stated practice of all official statistics including those of the Inst.f.Konj.forsch. (including Keiser and Benning op.cit. see p 202). It is followed by Baumgarten, and comparison of Hoffmann's data with that of the Stat. Reichsamt suggests he does also; although professedly presenting calendar year data. Cf. pp 444ff below.

*23 Baumgarten op.cit. p 67.

*24 Ibid. pp 169-70; Tables 7, 12, 13, pp 101, 118 below.

Table 2 The Fiscal Balance of the Aggregated Public Household Mrd.Rm. Current Prices*

	1925/6	1926/7	1927/8	1928/9	1929/30
1) Aggregate Expenditure	14.4	17.2	18.8	20.8	20.9
2) Less Cash Reparations	0.4	0.6	1.0	1.3	0.6
3) Effective Domestic Expenditure	13.9**	16.6**	17.7	19.5	20.3
4) Aggregate Current Revenue	12.8	14.7	16.7	17.8	17.9
5) Deficit excluding S.I.F.B.***	1.1	1.9	1.0	1.7	2.3
6) S.I.F.B.***	0.4	0.6	0.6	0.8	0.8
7) Deficit including S.I.F.B.***	0.7	1.3	0.4	0.9	1.5

NOTES: * Errors due to Rounding.
** These data also remove 0.1 mrd.Rm. payments to Reichsbank from aggregate expenditure.
*** S.I.F.B. = Social Insurance (excluding Unemployment Insurance) Fund Building.

SOURCES: Lines 1), 4): 1925/6 to 1928/9: Baumgarten op.cit. pp 94, 96, 168, 170.
1929/30: Konj.Stat.Hdb.(1936) p 161. To calculate revenue from this source deduct from the aggregate (i) Seignorage ('aus der Munzprägung') (ii) borrowing, reduction of funds etc ('Schuldenaufnahme, Fondsentnahme u.dgl.), (iii) transfers of surpluses from previous years (sonstige Einnahmen - see footnote thereto).

Line 2): St.Jb.f.d.Dt.R. 1929 p 427, 1930 p 477, and calculated thus: from total payments to the Agent-General, subtract Occupation Costs (Besatzungskosten) and Payments in Kind plus Transport (Sachlieferungen und Transporte)

Line 3): for source to footnote **; Baumgarten p 220; I assume that these payments were negligible in 1929/30 as in 1928/29.

Line 6): Hoffmann ... p 763. Cf. Table 1 p 85 .

It would be satisfying to be able to confirm these estimates from the evidence of Hoffmann, but unfortunately he provides neither estimates of gross investment, nor a satisfactory account of the depreciation procedures by which he obtains net investment; evidence of the fiscal balance is therefore not to be derived from his work.

So much for the ex post fiscal balance; but was the policy that produced the deficit truly expansionary?

As far as revenue policy is concerned, it seems reasonable to concentrate on the policy of the Reich, since it controlled all the most variable taxes.

Tax rates were raised sharply at the end of 1923 by means of series of tax decrees, with a view to enforcing the currency stabilisation *25. A number of 'once for all' taxes were imposed - eg the 'Rhein-Ruhr Abgabe'. In respect of the regular taxes the major measures were the raising of Turnover Tax as high as 2½%, and the decision to base the assessment of 'assessed' (veranlagte) Income Tax and Corporation Tax on the extremely 'gross' measure of turnover less wage and salary payments. Some rather crude basis was inevitable in the aftermath of the inflation, but this basis deliberately expanded tax receipts. Other tax rates were also raised, such as excises on luxuries (Luxussteuer), on stock exchange turnover etc.

With these measures however tas rates reached a maximum.

Already in the autumn of 1924 Turnover Tax was reduced in two stages

*25 A complete list of tax rate changes to 1927/8 appears in Stat.Reichsamt, Einzelschr ... no. 14 pp 43-5. See also Baumgarten op.cit. pp 13, 16-17, 59-61, 76-79, 134-6 on the following.

to 1½%; Income and Corporation Tax receipts, if collected on the temporary assessment basis, were reduced by 25%; Luxury Tax was cut from 15% to 10% and Stock Exchange Turnover Tax was also reduced. In 1925 tax revenues were increased by the reintroduction of tariffs, but in general, the trend toward reduction of rates persisted. The incidence of Income and Corporation Taxes fell as normal assessment bases became more common; expense allowances rules were relaxed, and marginal rates somewhat eased. Turnover Tax was cut to 1%; Stock Exchange Turnover Tax and Company Tax (Gesellschaftssteuer) further reduced. The tax reduction perhaps most potent in the long run came about as a result of an amendment from the floor of the Reichstag - the so-called 'Lex Brüning', whereby every time the monthly revenue from Wage Tax (Lohnsteuer) exceeded 600 mill.Rm for six consecutive months, the rate of this tax was reduced. This measure operated repeatedly during 1926-28; in these years further reductions in turnover tax and some excises were offset by increases in others, and in certain tariff rates.

The rates of taxes levied by the states and communes seem to have altered little over the period. The most notable change was at the beginning, when in 1924 a new tax was imposed on property, in an attempt to capture some of the windfall gains accruing to property owners whose mortgage burdens had been eroded. It was intended to devote a substantial part of the revenues from this tax - the so-called 'Gebäudeentschuldungssteuer' ('Hauszinssteuer' in Prussia) - to the provision of housebuilding finance *26.

*26 Baumgarten op.cit. p 15ff.

The general pattern of tax policy seems clear: rates raised to a crisis level in 1924, then quickly reduced again by the end of 1925. The effects of these measures on yields can be clearly seen in Table 4 below.

Table 4 Selected Tax Revenues 1924/25 to 1929/30
Mill.Rm. Current Prices

	1924/5	1925/6	1926/7	1927/8	1928/9	1929/30
A. Reich Taxes						
1 Reparations Dues	0.5	0.5	0.8	0.9	1.0	0.6
2 Wage Tax	1.3	1.4	1.1	1.3	1.4	1.4
3 Assessed Income Tax	0.9	0.8	1.1	1.3	1.5	1.4
4 Corporation Tax	0.3	0.2	0.4	0.5	0.6	0.6
5 Wealth Tax	0.5	0.3	0.4	1.0	1.0	1.0
6 Turnover Tax	1.9	1.4	0.9	1.0	1.0	1.0
7 Customs	0.4	0.6	0.9	1.3	1.1	1.1
B. State and Communal Taxes						
8 Ground and Buildings Tax	-	0.9	1.0	1.1	1.1	1.2
9 Inflation Compensation Tax on Buildings	-	1.3	1.5	1.6	1.6	1.6
10 Trade Tax	-	0.6	0.6	0.8	0.9	0.9

Tax Translation Key: 1 Sonderleistungen (raised by railways and industry for reparations);
2 Lohnsteuer;
3 (veranlagte) Einkommensteuer;
4 Körperschaftsteuer;
5 Vermögenssteuer;
6 Umsatzsteuer;
7 Zölle;
8 Grund- und Gebäudesteuer;
9 Gebäudeentschuldungs- (=Hauszins-) -steuer;
10 Gewerbesteuer.

SOURCES: Konj.Stat.Hdb.(1936) p 166; Baumgarten op.cit. pp 217-218.

The expenditure policy of the Reich followed a path complementary to that of revenue policy. Expenditure was cut back savagely in the

period November 1923 to April 1924; the aim was to make 15% of civil servants redundant and to reduce the salaries of the remainder below 1913 levels; expenditure on materials was to be reduced to a minimum, and new building programmes were suspended; payment of compensation to industry in the Ruhr was also interrupted *27. But already by later 1924 the cuts were gradually being restored on all the above items. By 1925-26 the Reich was initiating schemes to ameliorate the unemployment of those recession years (in addition to 'obligatory' aid to local authorities for unemployment relief). In 1927 cyclical recovery terminated these expenditures, but in the summer of that year the Reich budget was further burdened - as a result of an initiative from the floor of the Reichstag (though not unwillingly adopted by the government) - with substantial increases in civil service salaries and pensions. Köhler, the current Reich Finance Minister, estimated that these would cost the Reich c.300 mill. p.a.

There was, it seems clear, also steady pressure for the expansion of expenditure at the level of the states and communes. This is discussed in more detail on pp 102ff below; here I note that the Reich's work creation policies of 1926/7 and salary increases of 1927 had their counterparts at these levels. The overall effect can be traced in Table 5 (overleaf).

Thus, we see that the fiscal deficit which characterised the years under review was not an automatic consequence of the initial fiscal

*27 This description of expenditure policies follows Baumgarten op.cit. pp 11, 20, 70, 73, 142.

Table 5 Selected Items of Public Expenditure
Mill.Rm. Current Prices

Salaries and Fees	1925/6	1926/7	1927/8	1928/9	1929/30
1 All Governments	4796	5076	5527	6487	6632
2 Reich	741	787	922	986	995
3 States	1940	2039	2263	2591	2608
4 Expenditure on Materials*	3320	3447	3741	3963	4001
5 Economic Aid	846	1118	1188	1298	n.a.
6 Subsidies to Social Insurance	259	286	346	416	n.a.
7 Work-Creating Unemployment Relief	135	206	118	108	n.a.

* excluding investment expenditure.

SOURCES: Lines 1-4: Hoffmann ... pp 710-1.
Lines 5-7: Stat.Reichsamt, Einzelschr ... no 14 p 89.

structure, but the result of discretionary revenue-reducing and expenditure-increasing policy changes.

The political bases of this development were several. Firstly, the severe budgetary policy of 1924 was probably made possible only by the bypassing of the Reichstag via the use of 'emergency tax decrees' *28. The fact that two of the major deficit-creating measures - the 'Lex Brüning' of 1925 and the civil servant salary increase of 1927 - originated as Reichstag initiatives indicates the part played in generating the deficits by the parliamentary weakness of the unstable coalition governments. Nonetheless, it is also of relevance that Reinhold, the Reich Finance Minister at a critical period in 1926-27 (the period when deficits were beginning to be a serious matter) was not a scrupulous adherent of the principle of balanced budgets, and was in particular the initiator of the loan-financed work-creation schemes.

*28 Ibid. pp 6ff. Wd 13/2(1928) pp 1453ff, 'Zur Frage einer Reform der parlamentarischen Ausgabebewilligungsrechts'.

Two of his predecessors - Luther and von Schlieben, while more insistent on budgetary balance, were nonetheless eager to reduce taxes which in their view impaired 'Kapitalbildung' (saving) - such as turnover tax. And von Schlieben initiated the subterfuge whereby previous years' surpluses could be applied to cover present deficits. Reinhold's successor, Köhler, may have expressed adherence to the balanced budget principle, but himself bore a good deal of the responsibility for the 1927 salary increase. Hilferding, his successor, was neither more nor less 'orthodox' in his budgetary views than his predecessors, but the drastic circumstances of his period of office forced subscription to them *29.

The objectives of the government obviously did not include Keynesian demand management; the counter-cyclical policies (at that time frequently discussed in the press and in government circles) that were undertaken proved rather feeble *30. But an alternative policy is quite conceivable, in which the expenditure raising and revenue reducing measures had been much less vigorous; a state of affairs in which the budget had been balanced over the quinquennium 1924/5-1929/30 is therefore quite conceivable. Thus, one may fairly attribute to the

*29 For comments on the several Finance Ministers see Baumgarten op.cit. pp 16, 64-5, 129, 137-42; I Maurer op.cit. pp 14-18, 50-1; E Wandel, Hans Schäffer, pp 152ff, 176ff.

*30 The Work Creation Programme of 1926/27 was initially planned to cost 800 mill.Rm., financed by loans. See (vorläufiger) Reichswirtschaftsrat, Bericht ... in BA Silverberg Nachlass 248. In the event much was paid for out of revenue: I Maurer op.cit. p 18. See too MdW 5/4/28 p 531, 'Öffentliche Aufträge als Mittel der Konjunkturpolitik'. The views of Schäffer, a leading official in the Reich Finance Ministry, during 1929/30, are discussed in E Wandel op.cit. pp 145-6. The sensitivity of the authorities to the question is shown by the publication of monthly statistics of orders placed by the public sector: eg Wi.u.Stat. 1930 pp 857-60.

discretionary policy of governments and the political composition of the parliaments at all levels, the aggregated public household deficit of c.½ to 1mrd.Rm. per annum.

However the ultimate employment-generating effects of this deficit were probably slight. A number of modern U.S. studies converge on a multiplier which over two years rises to a value of about two *31. Because of the greater openness of the German economy, and the serious financial repercussions of the deficit, described in the next section, the multiplier in Germany was probably less *32. If the multiplier had a value of one, and the full-employment deficit was 200 mill.Rm., then it added less than ½% to aggregate demand. If the multiplier was two, and the full employment deficit 1.0 mrd.Rm., then it added c.2½%. Comparable estimates of the fiscal balance do not exist for the pre-war decade. Given the arms race and the revenue problems of the Reich then, it seems unlikely to have been very deflationary; but probably not significantly expansionary in relation to the economy as a whole either *33. That is, the net impact was probably not dissimilar to that of 1924-29. By contrast, the fiscal balance of the public household of the Federal Republic in the decade after 1948 appears generally to have been in surplus *34.

*31 Eg Gary Fromm and Paul Taubmann, Policy Simulations with an Econometric Model, pp 82ff (esp 84-8), 94.

*32 Note the parallel to the 'Treasury View' ! But for evidence that public borrowing did impair private, see DV III 11/1/29 p 453, 10/5/29 p 1073 (re Reich and Prussian Loans).

*33 P-C Witt, Die Finazpolitik des deutschen Reiches, 1903-13, passim, See Tables therein pp 378-80.

*34 F G Reuss, Fiscal Policy for Growth without Inflation, pp 157-68.

Turning from long term to short term, would there be any grounds for asserting that fiscal policy changes were partly responsible for the recession in late 1927-1928? Two remarks are relevant:

1) The policy changes just discussed indicate that the 'constant employment' deficit tended the rather to increase in 1927-28. This would be the combined tendency of the civil service salary increase, and the simultaneous institution of the Reich Institute for Employment and Unemployment Insurance, which later committed the Reich to heavy subsidies. Practically from the start, expenditure of the Institute out-ran its 'additional' revenues from contributions. On the other side, revenue policy changed little at this time.

2) However it is evident from Table 2 (p 91 above) that the aggregate level of public household expenditure ceased to increase between 1928/29 and 1929/30. This is doubtless related to the growing public sector financial crisis described in the next section. This plateau was probably not reached till after the general upper turning point in activity. If in the absence of financial constraints, public expenditure would have continued to grow, then by the 'balanced budget multiplier' this constraint aggravated the recession.

4.3. Financing the Deficit

4.3.1. The net public household deficit conceals the offsetting surpluses of the social insurance institutions, and the larger 'gross' deficits of certain governments, notably the Reich and certain communes.

I confine the discussion of this section to these two levels of government *35.

A public deficit can be financed by the issue of debt to

i) the central bank. As has already been noted, in this period this form of financing was scarcely possible *36. Had the President of the Reichsbank been amenable, doubtless the legal restrictions could have been circumvented, but Dr Schacht became increasingly hostile to the Reich government after 1927, just as its financial difficulties were multiplying; the legal provisions reinforced his political independence *37.

ii) to the banking system. This could mean a) a public sector bank (eg a communal savings bank); b) a domestic private credit bank; c) a foreign bank. Direct borrowing from the last source was rather slight up to 1929, as Tables 7, 10 and 11 pp 101, 118 indicate.

iii) to the public by the issuing of long term bonds (at home or abroad), usually through the intermediation of a banking consortium; or by the issuing of treasury bills.

I will discuss firstly the borrowing problems of the communes, then those of the Reich.

*35 Re Prussian deficits see DV III 11/1/29 p 453; 18/1/29 p 485-6.

*36 See p. 15 above.

*37 H Müller, Die Zentralbank, eine Nebenregierung p 39; for the Reich Finance Ministry view of Schacht, E Wandel op.cit. pp 137-9.

4.3.2. Borrowing Problems of the Communes

Statistics of the issue of new debt are not separately available for the communes before the Stat.Reichsamt survey of the public debt at 31.3.28; for annual estimates the increase in total public debt must do duty. Note however, that except for 1924 (Dawes Loan) and 1930 (Young Loan) public foreign borrowing was dominated by the communes

Table 6 Annual Increase in Public Household Debt Mill.Rm.

Issued	1924	1925	1926	1927	1928	1929	1930
At Home	27	37	1018	714	663	1274	457
Abroad	n.a.	656	724	361	1356	97	1172

SOURCE: Hoffmann ... pp 790-1.

Table 7 Communal Debt at 31.3 Mill.Rm.

	1928	1929	1930
I Pre-1924 Debt (revalued)	1138	1202	1193
II Long Term Debt - Aggregate	3082	4276	4962
a) Issued Abroad	512	726	721
b) Issued At Home	2570	3550	4241
III Short Term Debt - Aggregate	1555	2252	2945
a) Issued Abroad	30	12	14
b) Issued At Home	1525	2240	2931
IV Debts held by Other Public Bodies	767	1034	1156
SUM New Debt (II + III)	4637	6527	7906
ANNUAL INCREASE (II + III)		1890	1379

SOURCE: (Proximate) Konj.Stat.Hdb. (1936) p 172; (ultimate) Stat.Reichsamt survey; cf. above with Stat.Reichsamt, Einzelschr ... no. 13, Die öffentliche Verschuldung ... p 234.

(though the states also participated) *37A

Communal governments experienced constant pressure to increase expenditure on the one hand, but on the other possessed a barely adequate tax base - even including transfers *38.

So-called 'municipal socialism' *39, which had been observed before the war, expanded after it both under the political pressure of enlarged electorates and under the technical pressures which dictated improvements in infrastructure - electricity supply, public transport, the housing shortage, etc *40. The pressure may have been intensified by an unsatisfied backlog of projects due to the relative poverty of communes during the inflation *41. The obverse of this is of course

*37A Cf Tables 12 and 13 pp118.

*38 Wk 12(1933) pp245ff, 'Die Finanzlage der deutschen Gemeinden'; MdW 3/1/29 pp1-5, 'Die Finanzlage der Gemeinden'; O Büsch op.cit. pp22-50,155-6. Also on Berlin: DV I 13/5/27 p1021; Wd 13/2(1928) pp 1505ff, 'Die Kommunalfinanzen'.

*39 Eg Bankarchiv XXX (1930/1) pp503ff, 'Die Notlage der Kommunen'; O Büsch op.cit. pp35ff; K H Hansmeyer (ed) op.cit. p 80.

*40 As of 31.3.28 40% of total local authority post-stabilisation borrowing was for public utilities and transport improvements. A further 27% was for housebuilding: Stat.Reichsamt Einzelschr no.13, Die öffentliche Verschuldung ... p274. A close study of the sources revealed little of the 'conspicuous consumption' by communes of which they were often accused; although some of the largest cities (Munich, Leipzig, Dresden, but not Berlin) were 'offenders'. See the discussions of communal financial policies in the Advisory Council: BA R2/2067, 2126-30. Also O Büsch op.cit. ref *39; Wd 14/2 (1929) p 1583.

*41 Communes received a variety of subsidies and credits from the Reich and states but, at least till December 1922, lags in their transmission seriously eroded their value. Nevertheless, general current expenditure seems not to have suffered greatly; but adequate financing for capital projects was hard to get: K H Hansmeyer (ed) op.cit. pp 60-64 (especially 88-9, 94).

that communes emerged from the inflation with a low fixed debt burden - even allowing for likely debt revaluation *42, and hence felt free to incur new debt. From the second half of 1924, at the latest, communes began to borrow, short term at first, at home and abroad *43. The pressure which compelled a high level of borrowing were felt most acutely by the large cities. The increase in their population compelled them to spend relatively more on social welfare and infrastructure, but the agreement (Finanzausgleich) which determined their share of tax transfers disadvantaged them the most, since it was based on relative revenues in 19[illegible] *44.

In financing public works, the general practice of local authorities was to draw on short term credits while the work was in progress, and to consolidate these, when it was nearing completion, with a long term

*42 Assuming comparability of estimates, in 1928 the aggregate value of (revalued) pre-1924 communal debt was 1.2 mrd.Rm. (Table 7 above) whereas from Hoffmann ... p 799 communal debt in 1913 stood at 5 mrd.M. See too W Lotz, 'Finanzen ...' p 497.

*43 E-A V/1 Die Reichsbank, pp 81ff; R Kuczynski, Deutsche Anleihen im Ausland ... p 20. R Ott op.cit. pp 98, 103. Since Prussia issued guidelines about communal foreign borrowing in November 1924, it must have recommenced earlier. Already during the inflation communes had borrowed abroad. See K H Hansmeyer (ed) op.cit. pp 77-8.

*44 See refs *39. For this reason, large cities had super-proportionate borrowing requirements. According to a survey of communal indebtedness in early 1928, undertaken by the Advisory Council, 4/5 of the borrowing by communes of above 80,000 population was accounted for by that of the six largest cities of the Reich: BA R2/2128, sitting of 18/1/28. On Berlin, see O Büsch op.cit. pp 3ff, 107ff. Berlin's share in tax transfers fell relatively through 1924-31.

flotation *45. The timing, indeed the possibility, of such a flotation depended on the conditions of domestic and foreign markets. Consonant with the already-described history of the capital markets *46, we note in Table 6 (p 101) the earlier advance of foreign than domestic issuing (in 1925), but the rapid recovery of the latter down to February 1927, and its deterioration thereafter. Though there was some recovery from the low point of 1927, public household, and therefore communal domestic bond issuing during 1928-29 remained less than that of 1926 *47. That this was a result of failure of domestic demand for bonds rather than of a reduction in their supply is evident both from the pressure of foreign issuing in 1928, and from the fact of undersubscribed domestic flotations *48. Access to foreign markets was not however solely a function of their inherent 'absorbtive capacity'. Alarmed by the flood of local authority foreign issues in later 1924, the Reich agreed with the several states to set up the already-mentioned Advisory Council for Foreign Credits (Beratungsstelle für Auslandskredite). Guidelines to govern its

*45 This is indicated by a perusal of applications considered by the Advisory Council: BA R2/2126-30; especially R2/2128 sitting of 18/1/28. (But the Council actually stipulated that it preferred to receive applications for foreign capital issue at this stage: R Ott op.cit. p 147). Cf. E-A III/2 op.cit. p 64.

*46 See pp 23-45 above.

*47 Eg the failure of a 10 mill.Rm. domestic bond issue of the Deutsche Sparkassen- und Giroverband: DV II 3/2/28 pp 551, 'Die Konjunktur'.

*48 Cf. a letter from O Mulert, President of the Association of German Cities, to the Reich Finance Minister 1/10/27, in BA R43 I/656. On undersubscription: BA R43 I/635, 'Bericht des Herrn Reichsbankpräsidenten ... ' 19/7/28 pp 16-18.

'advice' were promulgated by decree in December 1924 and January 1925 *49. The states undertook to enforce the 'advice' of the Council with respect to applications for i) direct communal foreign credits; ii) foreign flotations on behalf of communes by communal credit institutions; iii) communal Reichsmark credits whose creditor was foreign. iv) The states and the Reich itself undertook to abide by the advice/guidelines of the Council before borrowing abroad themselves *50.

The Council sought to assess applications in terms of their effects on the stability of the currency *51, on the finances of the applicant, on the wider economy (eg effect of a given rate of public foreign borrowing on private), and on general political relations abroad (especially in connection with reparations). *52

To effectuate these considerations, the Council applied certain 'rules of thumb'. For example short term credits were normally not subject to scrutiny provided that they met certain conditions as to terms, and that their repayment was assured *53. Secondly, for long term

*49 R Ott op.cit. pp 98-9; the operation of the Council, though not its economic consequences, as described in detail by H Dietrich-Troeltsch in K H Hansmeyer (ed) op.cit. pp 174-219.

*50 R Ott op.cit. pp 105-111. The Council had no powers over other foreign credits. The decision whether or not to exempt these from Capital Yield Tax was delegated (by the Reichstag) to a committee of the Reich Finance Ministry, having a certain membership overlap with the Council. A Norden, Hearing before E-A V/1 Die Reichsbank op.cit. p 179.

*51 More generally, the Reichsbank wished to use the Council to improve its control of the money market. Dietrich-Troeltsch, in Hansmeyer (ed) op.cit. pp 179-80.

*52 R Ott op.cit. p 97.

*53 Ibid. pp 125-6. Short term foreign borrowing by the communes was small. See Table 7 p 101 above, and the discussion in the Council cited in *44.

flotations standard terms of issue (varying with foreign market conditions) had to be achieved or bettered. Thirdly a distinction was drawn between 'productive' and 'unproductive' uses of the proceeds from long term loans. To qualify as 'productive' the project in question had to "serve the interests of the whole economy, and preferably by enabling an increase in exports or reduction in imports, in some clearly demonstrable manner" *54. In practice the criterion boiled down to the position that applications for foreign financing of electricity, water or gas work construction were (at least up to mid-1927) approved without question; applications related to transport developments would only be approved where direct benefit to industry or agriculture could be shown, and applications related to house-building or recreational facilities would be refused *55. From the standpoint of currency considerations at least, the rule seems reasonable, if necessarily rough, pace the criticisms of many contemporaries and historians *56.

Quantitative assessment of the degree of restriction imposed by the Advisory Council is problematical if only because public authorities would naturally tend to overstate their financial needs in making application *57. However, from Table 8, it appears that already in

*54 Guidelines, Section BIII para.2, cited from R Ott op.cit. pp 135-6; see discussion there, pp 136-43; also letter from Schacht to the Reich Chancellor of 27/6/27 BA R43 I/641.

*55 R Ott op.cit. pp 135-6; K H Hansmeyer (ed) op.cit. pp 205-9; E-A V/I Die Reichsbank pp 97-9, 173ff.

*56 R Ott loc.cit. O Mulert as cited in *48. More pragmatic is the criticism eg of H Fürstenberg, 'Die Neuregelung der Beratungsstelle', Bankarchiv XXIX (1929/30) pp 399ff. See the defence of its chairman (A Norden) in Wd 13/1 (1928) pp 593-5.

*57 On the other hand, most applications had been vetted by the competent state before presentation.

Table 8 Percentage of Total Sums Applied for and Approved by the Advisory Council for Foreign Credits Mill.Rm. or %

T = Total Applied for (mill.Rm.)

A = Percentage Approved (%)

Borrower	1925		1926		1927		1928**	
	T	A	T	A	T	A	T	A
Communes	446	65	445	39	186	59	962	137
States	151	92	313	87	141	100	84	100
Agric.	10	100	105	100	336	100	231	93
Industry*	88	100	152	95	81	62	n.a.	n.a.
TOTAL	695	75	1016	68	744	86	(1277)	(51)

* with government guarantee ** provisional

SOURCE: E-A V/1 Die Reichsbank, p 85; based on information from the Reich Finance Ministry.

1925 and 1926 communal applications were severely cut down, more severely than those of other types of borrower. My own calculations from reports of the sittings of the Council indicate that in the year 1926 about 45% of sums applied for by local authorities were approved *58. These percentages seem sufficiently low to constitute evidence that the Council did from the start restrict communal foreign

*58 BA R2/2126-7. Calculated from a sample of 2/5 of applications considered. Not all of the 2/5 could be included: for a sizeable minority the sums applied for, or, less often, approved, were not recorded. Cases where decision was postponed were omitted; but those approved, subject to minor improvement in terms of issue, were included. Where both the original demand of the commune, and that approved by the state were recorded, the former was used (but in some cases only the latter was available).

borrowing considerably *59. There were evasions, but not on such a scale as to nullify the restrictions *60.

After December 1926, access to foreign capital markets was never as straightforward again. First of all, there was the general suspension of the exemption of foreign bonds from Capital Yield Tax in the first half of 1927 *61. From the protocols it does not appear that the Advisory Council met again till early September 1927. The reason for this seems to have been dissension in its ranks *62. On the one hand the Reichsbank represented - throughout the period 1926-29 - a restrictive interest, constantly intervening to urge refusals or reductions of sums applied for. This follows from its responsibility

*59 Against this must be set the fact that Local Authority foreign bond prospectuses often traded, in a vague way, on the Council's imprimatur. Eg in the prospectus for a Leipzig ℳ5 mill. bond issue approved 5/2/26 (BA R2/2126 - original application = ℳ6 mill.) it was stated: "The bonds are issued with the approval of Saxon and German governmental authorities". Foreigners may have regarded this as a guarantee of financial soundness, which it was not. Cf. the discussion in BA R2/2067; also DV III 19/7/29 p 1426. Norden thought that the Council legitimately enhanced issuing terms: see citation in *56; also E-A V/1 Die Reichsbank p 180. So did the Reichsbank: F Müller Referat III/3 in Untersuchung des Bankwesens Pt 1 vol 2 pp 209-11.

*60 See R Ott op.cit. pp 163ff; E-A V/1 Die Reichsbank pp 90-4. Apart from the substition of uncontrolled short term debt (which substantiates the arguments of the critics) the major method of evasion was issue of bonds in the name of commercially organised enterprises. See Wd article cit. in *41; also F Speth Deutschlands Auslandsverschuldung pp 65-6. The new guidelines sought to close some loopholes: E-A V/1 op.cit. p 82.

*61 See pp 34-5 above.

*62 Actual membership of the Council is given by R Ott op.cit. pp 151ff.

for the currency, but was accentuated by the views of Dr Schacht *63. The other pole was provided by the states' representatives, who generally supported the expenditure and borrowing policies of the communes and tended to minimise potential dangers *64. The Reich government tended to stand in the middle; hence broadly determined the issue *65. But the Council could not operate in the face of the implacable hostility of the Reichsbank to its policy, and the reason for the long hiatus in its activity in the summer of 1925 probably lies in the attitude of Schacht himself.

Schacht's agitation about the level of communal foreign debt was expressed in public speech *66; also in strong representations to the Reich government *67. Shortly after the Advisory Council reconvened in September, the Reichsbank representative moved the

*63 Schacht was initially quite favourable to foreign credits; but between 1925-27 became increasingly hostile. E-A V/1 Die Reichsbank pp 169-75; also G Hardach, Weltmarktorientierung ... pp 55ff; H Muller, Die Zentralbank ... pp 62ff.

*64 The states' attitude can be detected in their voting on the Council; cf. the remarks of Schröder of the Prussian State Bank and of Prussian officials, minimising the alarm over the findings of the Council's survey of communal indebtedness: BA R2/2128, sitting of 18/1/28.

*65 A clear example of this is the discussion of the Berlin application on 30/4/28: BA R2/2129.

*66 Schacht's 'Bochumer Rede' (speech in Bochum, in DV II 25/11/27 p 227, 'Aus der Woche'; also B Benning, Der 'schwarze Freitag' ... p 149. Earlier, his statement in E-A V/1 Die Reichsbank pp 112ff, 174.

*67 BA R43 I/656. Letter of 18/7/27 from Curtius (Reich Economics Minister) to the State Secy. of the Reich Chancellery, requesting a meeting of the cabinet with Schacht to discuss his views. Letter of Mulert to Reich Finance Minister (cited *48) expressing concern over the outcome of a meeting between the Minister and Schacht on 28-29/9/27. Cf. K H Hansmeyer (ed) op.cit. pp 164ff.

implementation of stricter guidelines, which were approved at the meeting of 4 November *68.

Thus the attitude of the Reichsbank gravely impeded the activity of the Council throughout 1927 *69. A further impediment arose in the autumn of that year in the shape of foreign dissatisfaction with the conduct of German public finances. This was crystallised in the comments of the Agent-General for Reparations, in his half-yearly report of June 1927, but more sensationally in October, when he wrote and published a memo on the subject to the Reich government *70. It seems clear that this plain criticism of tendencies toward deficit in Reich and communal budgets added to the disquiet of foreign lenders *71.

*68 BA R2/2128, sittings of 20/9/27 and 21/11/27.

*69 See the Prussian attack on the indecision of the Reich in the face of Reichsbank pressure: BA R2/2128, sitting of 10/2/28. On the Reich/Reichsbank disagreement see DV II 14/10/27 pp 35-6, 'Aus der Woche'.

*70 Cited according to typescript of memo in BA Nachlass Silverberg 10. More conveniently bound at end of the Agent-General's Report of Dec. 1927. The A-G seems to have been influenced by Schacht, and by 'business' views: BA R43 I/635, Bericht ... of 20/1/28; K H Hansmeyer (ed) op.cit. pp 164ff; H Brüning, Memoiren p 129.

*71 Cf footnote *79 below. Already the indecision of the US State Dept. in Sept. 1927 about granting admission to a Prussian loan (because of the question as to primacy of Reparations) had heightened the nervousness of foreign markets: DV II 7/10/27 p 25; G Hardach, Weltmarktorientierung ... p 83; Centralverband ... Materialien ... p 24. An article in the 'Times' expressing disquiet is cited in DV I 9/9/27 p 1564. The Agent-General clearly believed that German deficits per se weakened German bonds abroad.

About this time the Council became dubious of the ability of foreign markets to absorb the potential public authority demand for credit, and instituted a survey of the credit demands of all communes with populations above 80,000 *72. In September and early October 1927 it approved a small number of credits. Not until 15/3/28 (ie after receipt and consideration of the findings of the above survey) did it resume regular review of applications. Thus, in effect, the whole of 1927 and the first quarter of 1928 were periods of very intermittent operation by the Council. This is reflected in Table 8 (p 107) by the small total of sums considered in 1927.

The Council worked solidly till the end of June 1928, considering the huge backlog of applications from individual communes, and also the 'Sammelanleihe' (consolidated loan issue) of the German Savings and Clearing Institutes Association (Deutsche Sparkassen- und Giroverband) on behalf of a large number of smaller communes. Thereafter, till the end of 1929, its operation was again very intermittent. Ott characterises the altered attitude of the Council after the summer of 1927 by saying that whereas previously the 'productivity of use' criterion predominated, thereafter sheer currency considerations predominated. The new guidelines were explicit that flotations were permitted only when domestic and foreign currency market considerations

*72 Cf *64.

allowed *73. Only after this time does one find applications reduced merely on grounds of 'the general restriction' *74. And in fact, by my calculations from the protocols, only 28% of sums applied for by local authorities were approved between September 1927 and the end of 1928, as against 45% in 1926 *75.

In broad terms of the politics of the Advisory Council, the swing in its attitude after mid 1927 is reflected in the fact that, whereas

*73 R Ott op.cit. p 148. See also the Report of the Commissioners of the Reichsbank of 7/12/27 (BA R43 I/635), 'In the new formulation [sc. 'of the guidelines'] it is expressly emphasised that economic and political reasons dictate the utmost restriction in the taking up of foreign credits by public authorities'. For a clear discussion, Zement 1928 p 816, 'Neue Richtlinien ...'. The Council seems to have agreed that the Reich should set global maxima for issues in the forseeable future (BA R2/2128, sitting of 18/1/28), a decision dictated, in Dietrich-Troeltsch's view, by the failure of the 'productivity' criterion: Hansmeyer (ed) op.cit. pp 213-7. I am not sure whether the proposal was implemented.

*74 Eg the discussion of the applications of Bramstedt and Weisswasser on 4/4/28, or of Hannover on 13/4/28 - BA 2/2128.

*75 (i) The method is described in *58. For 1927-28 however, I included all applications for which enough information is available. The reduction in the percentage approved may partly reflect a conscious escalation of demands by local authorities, but there is no evidence that the Council thought this; and anyway it presupposes the point at issue: viz that communes knew that stringency had increased.

(ii) My results are in conflict with the Council's published data (Table 8 p107) which show no decline in % approved. Both from the arithmetic and the general tenor of the records I find the constancy puzzling. My calculations for both periods are incomplete, but not, I think, unrepresentative. The published 1928 data are, however stated to be 'provisional'. In any case absolute amounts rejected were, in 1928 twice as great as in 1926; and according to the same source (E-A V/1 Die Reichsbank p 87) this increased the gap between foreign and domestic yields on municipal bonds.

the Council had formerly tended to vote with the states against the Reichsbank, thereafter the reverse was true. This implies that the representatives of the Reich had 'changed sides'. But in seeking to apportion responsibility for the decreasing proportion of communal applications approved, we have to visualise the alternatives. It is clear from the protocols that the Council itself believed that its hand was forced by the unreceptive condition of the US market *76. Did, then, the increased restrictiveness of the Council exert a truly autonomous influence, as many contemporaries believed *77? Two answers are relevant:

i) If, in Table 9 p 114, we compare the years 1927-28 and 1925-26, it can be seen that the foreign borrowing of governments (all levels) relative to that of private enterprises fell. (Private sector foreign borrowing was not subject to the Council.)

ii) Of the common pressures causing a reduction in German foreign borrowing in 1927-28, the bulk have domestic roots. See pp 108ff above (if we allow that the criticisms of the Agent-General were in large measure domestically inspired).

It therefore seems fair to state that the policy of the Advisory Council in particular and of the Government in general was the major cause of the reduction in communal foreign borrowing, up to mid 1928.

*76 Eg the discussion on 4/11/27 (BA R2/2128) and, of the survey, on 18/1/28 (ibid.); also of the conditions of issue of the German Clearing and Savings Institutes Association's loan on 15/5/28 (BA R2/2129). Finally, the article by A Norden (ref. *56) p 595.

*77 See *56; further R Ott op.cit. pp 157-9, F Speth, op.cit. pp 65-6. Dietrich-Troeltsch's attribution of the increased stringency to an internal learning process reinforces this conclusion. See *73.

Table 9 Annual Rates of Issue of Fixed Interest Bonds at Home and Abroad 1925-28 Mill.Rm.

	1925	1926	1927	1928
A. At Home				
Government (all levels)	15	654	698	463
Public and Cooperative Enterprises	22	366	16	224
Mortgage Bonds**	840	1628	1597	1459
Bonds of Other Private Enterprise*	79	322	194	285
B. Abroad				
Government (all levels)	379	327	254	166
Public and Cooperative Enterprises	260	334	78	419
Mortgage Bonds**	120	197	515	367
Other Private Enterprise*	16	64	14	32
TOTAL - At Home	994	3435	2859	2920
TOTAL - Abroad	1267	1577	1412	1466

* including banks ** including 'Kommunalobligationen'.

SOURCE: E-A V/1 Die Reichsbank p 98 (from data of Stat. Reichsamt).

From about that date, a crisis began to develop in local authority finances *79, as the consequence of 12 months of poor conditions on the domestic market, and 18 months of sporadic access to foreign capital markets. Thereby a huge overhang of short-term debt had been created, whose constant renewal became ever harder *80. According to the Association of German cities, whereas in 1913 towns of above 25,000 inhabitants had an aggregate short term debt of 60 mill.M.; already in 1928 such had an aggregate short term debt of 706mill.Rm. *81.

*79 Wd 13/2(1928) p 1094, 'Die kommunale Auslandsanleihen'; DV II 13/3/28, pp 844-5, 'Aus der Woche'; MdW 3/1/29 pp 1ff, 'Die Finanzlage der Gemeinden'.

*80 Wd loc.cit. *79; DV II 5/4/28 p 881.

*81 As reported in E-A V/1 Die Reichsbank p 94.

In January the Advisory Council's survey reported that 70% of desired foreign loans were to consolidate debts incurred in work in progress, or completed *82. The purpose and urgency of the consolidated loan of the German Savings and Clearing Institutes Association was just this *83. The emergence of the crisis can be traced with acute force in the case of Berlin *84. In April 1928 the city's application to raise 227 mill.Rm. abroad (of which the relevant Prussian ministries had approved 80-100 mill.Rm.) was pared down by the Council to 60 mill.Rm. Signs of strain in the Berlin finances reappeared in the discussion of the application of the Association of German Savings and Clearing Institutes, on 26/11/28. By the end of 1929 the crisis was extreme. The city's short term indebtedness had expanded from 107 mill.Rm. at the end of 1927 to 399 mill.Rm. at the end of 1929. An application to take up a huge medium term foreign credit to repay pressing obligations was grounded with the threat that the alternative was bankruptcy - an eventuality with serious consequences for the whole of German foreign credit. The Council was inclined to take the threat seriously, though aware that it was, in measure, being browbeaten. The crisis in Berlin finances persisted through 1930, forcing sales of assets, increased appropriation of the surpluses of communal enterprises etc. If most acute in Berlin, the same features were reproduced across the entire local authority sector, and persisted, indeed intensified into the depression, despite attempts at debt

*82 See *64. Also Stat.Reichsamt, Einzelschr ... No 13 pp 321ff.

*83 BA R2/2128, sitting of 23/4/28.

*84 For the following see the relevant discussions in BA R2/2128 (30/4/28); 2130 (especially 11/12/29); O Büsch op.cit.pp 185ff.

consolidation, sale of assets, reconstruction of enterprises etc *85. Bankruptcies seem to have been avoided in general, but at the cost of sustained acute tension in the short term financial markets throughout these years *86.

Table 10 Net Surpluses Transferred from Public Enterprises** to Communes, Provinces, Communal Associations etc. Mill.Rm. Current Prices

	1925/6*	1926/7*	1927/8*	1928/9*	1929/30*
Gas, Water, Electricity	159	339	379	430	459
Transport	20	33	24	44	9
Agric., Forestry	19	40	113	10	51
Credit Institutions and Other Enterprises	13	6	5	6	13
TOTAL	211	378	516	488	539
Total excluding Agric. Forestry	192	338	403	478	488

* 1925/6 - 1926/7 exclude communes of less than 2000 people
1927/8 - 1929/30 include " " " " " "

** The Survey comprehends communal enterprise irrespective of legal form. See Stat.Reichsamt, Einzelschr ... No. 15, loc.cit. in Sources below.

SOURCE: Wi.und Stat. 1931 p 296, 1932, pp 21,22; Stat. Reichsamt. Einzelschr ... No. 15, Die kommunale Betriebe, pp 20-37.

*85 Eg the Council's discussion of towns in Hesse in May 1928 (BA R2/2057); on Saxony, see Schacht's report of 13/4/28 (BA R43 I/635). Further: MdW 19/12/29 pp 1915-7, 'Sanierung der Städte'; Wd 14/2 (1929) p 2116, 'Die Umschuldungs- und Sparaktion der deutschen Städte'; Stat. Reichsamt Einzelschr... no. 32, Die Finanzlage der deutschen Gemeinden, passim. On sale of assets: E-A III/2 Die deutsche Elektrizitäts-wirtschaft pp 81-2.

*86 DV III 5/4/29 p 876, 6/9/29 p 1668, 'Die Konjunktur'. On the failure of the domestic bond issues of Frankfurt, Braunschweig and Breslau etc; DV III 20/9/29 p 1714, 27/9/29 p 1746, 23/8/29 p 1583.

Table 11 Net Transfers from Public Enterprises to Communes, per head of Population, by Size of Commune

Population Size	1913	1925/6	1926/7	1927/8	1928/9
Above 100,000	8.8	12.3	15.3	13.4	18.6
50,000 - 100,000	5.9	8.4	12.0	11.8	16.6
25,000 - 50,000	4.4	6.4	11.1	11.0	14.0
10,000 - 25,000	4.0	5.0	7.8	7.9	9.3
5,000 - 10,000	3.3	3.8	6.2	6.1	7.5
2,000 - 5,000	3.2	4.2	4.9	5.3	5.6
Less than 2,000	1.4	2.2	3.7	3.8	3.8

SOURCES: Wi.und.Stat. 1931 pp 295, 299; Stat.Reichsamt, Einzelschr... No. 15, Die kommunale Betriebe pp 18-19.

Another indication of the strain in local authority finances is the attempt to increase the appropriation of surpluses from their enterprises *87, and the fact that this increase is most marked in the case of the larger communes *88. Tables 10 and 11 illustrate this.

4.3.3. Borrowing Problems of the Reich

Tables 12 and 13 are the counterparts, for the Reich and the states, of Table 7 on p 101 . A comparison of the three will show the relative unimportance of the states' debt, both in respect of level and of rate of increase during 1928-30 *89.

*87 Stat. Reichsamt, Einzelschr ... no. 32 pp 17ff. O Büsch op.cit. p 115; E Wolfgang, 'Kritische Darstellung ...' p 816.

*88 Perhaps however the heavier dependence of the smaller communes on agricultural income, which slumped in 1928/29 explains this. See below pp 350-356 .

*89 The states also had borrowing problems after 1927: W Lotz op.cit. pp 480-90.

Table 12 Debt of the Reich at 31st March Mill.Rm.

	1928	1929	1930
I Pre-1924 Debt (revalued)	5560	5215	4927
II Long Term Debt - Aggregate	1384	1918	2495
a) Issued Abroad	(884)	(856)	(824)
b) Issued at Home	(500)	(1026)	(1671)
III Medium and Short Term Debt - Aggregate	187	1095	2208
a) Issued Abroad	(-)	(45)	(240)
b) Issued at Home	(187)	(1050)	(1968)
TOTAL - New Debt (II + III)	1561	3013	4703
Annual Increase - New Debt (II + III)		1452	1690

Table 13 Debt of the States at 31st March (excluding Hanse Cities) Mill.Rm.

	1928	1929	1930
I Pre-1924 Debt (revalued)	61	61	64
II Long Term Debt - Aggregate	666	813	812
a) Issued Abroad	(379)	(376)	(371)
b) Issued at Home	(287)	(437)	(451)
III Medium and Short Debt - Aggregate	571	849	1087
a) Issued Abroad	(133)	(106)	(162)
b) Issued at Home	(438)	(743)	(925)
TOTAL - New Debt (II + III)	1237	1662	1909
Annual Increase - New Debt (II + III)		425	347

SOURCE: (Tables 12 and 13): Konj.Stat.Hdb. (1936) p 172
(ultimate: Stat.Reichsamt Public Debt Surveys).

Turning to the Reich, it is generally agreed that the already-described process of tax rate reduction and expenditure increase after 1924 eroded the surplus which had been generated in that year, and by 1926-27 began to necessitate recourse to the capital market *90. All the estimates of the budget of the Reich are consistent with this account *91. Already in 1926, Dr Reinhold, the Reich Finance Minister had a large long term capital issue in view, as a major means of financing the Work Creation Programme of that period *92. The history of this loan (issued Feb. 1927) has already been described (p 35): the Reich had to spend c.100 mill.Rm. during this period in supporting it, and in August had to convert it to a 6% basis *93. The Finance Minister had 'misjudged the market'.

In 1928 the financial deficit of the Reich widened alarmingly *94.

*90 For this account see MdW 25/4/29 pp 641-3, 'Erschütterung der Reichsfinanzen'; Wk 8(1929) pp 157ff, 'Etats- und Kassenlage des Reichs'.

*91 The estimates of the Agent-General are consolidated in R E Lüke Von der Stabilisierung zur Krise p 81. The official estimates are in Konj.Stat.Hdb(1936) p 162, and can be made comparable with the former by subtracting Fondsentnahme, Schuldenaufnahme, and sonstige Einnahmen from revenues. Also Baumgarten op.cit. pp 34, 92, 93-4, 156, 166.

*92 See (vorläufiger) Reichswirtschaftsrat, Bericht ... (as cited in *30) p5. G Upmeier (in K H Hansmeyer (ed) op.cit. p120) detected proto-Keynesian analysis in Reinhold's plan. Wk 6 (1927) pp 36,40,151; Wd 12/1(1927) pp121,249. Counting the Dawes external loan, this was only the second post-stabilisation flotation of the Reich.

*93 See Wd 12/2(1927) p1252; Wk 8(1929) pp157ff; P Hertz, 'Reich und Reichsbetriebe' pp521ff. The ultimate proceeds were c.430 mill.Rm. (Wk 7(1928) p186) but of this at least 150mill. was held by other government bodies. In the view of some this was intended as a kind of open-market operation on the cash balances of disparate government agencies.

*94 A succinct account occurs in P Hertz loc.cit.

This was, to a minor extent, because of over-optimistic forecasts about the development of tax revenues *95; to a much greater extent probably because of underestimation of expenditure, especially of subsidies to the new Reich Institute for Employment and Unemployment Insurance. As a result, the Reich was forced, for the first time, to take advantage of its right to issue Treasury Bills rediscountable at the Reichsbank *96. By the end of 1928 a current cash deficit (Kassendeficit) of c.1 mrd. Rm. had opened up, a deficit which the allowable lines of credit from the Reichsbank, and other direct credits from the Rentenbank could in no way cover *97. In May 1929, Hilferding, then Finance Minister, attempted to float another 500 mill.Rm. long term loan on the home market on extremely favourable terms (including extensive tax concessions on this interest). It failed miserably, had to be reduced to 300 mill.Rm., and ultimately only 180 mill.Rm. was taken up *98. The Reich got behind with its

*95 Overestimate of revenue is often blamed. See *97; but the actual shortfall was only c.40 mill.Rm. Wi.u.Stat. 1929 p 380.

*96 M B Northrop op.cit. pp 56, 147; BA R43 I/635, Bericht ... of 13/4/28 p 4. From mid-1927 the Reich had repeatedly to take up its permitted 100 mill.Rm. overdraft with the Reichsbank.

*97 Stat.Reichsamt Einzelschr ... no. 14 p 66. See MdW article cited in *90; also W Lotz op.cit. pp 491-2, and Table 12, p 118 above. Wd 13/2(1928) pp 1751ff, 'Die Finanzlage des Reichs'. J Popitz, 'Finanzpolitische Betrachtungen zur neuen Reichsanleihe', Bankarchiv XXVIII(1928/9) pp 287ff. The state of the financial markets also affected Reich short term borrowing: DV II 4/5/28 pp 1036-7.

*98 The news of the intention to float such an issue depressed the market: DV III 10/5/29 p 1073, 'Die Konjunktur'. On its failure: DV III 14/6/29 p 1244; Wd 14/1(1929) p 803; 15/1 (1930) pp 959-60, 'Die Reichsfinanzen nach dem Abschluss fur 1929'. E Welter, Stockung ... pp 13-4.

tax transfers to the states and did not know from month to month whether it could pay salaries *99. Hilferding was compelled to go cap in hand to the private credit banks at home and abroad for accommodation *100; his successors were forced to negotiate, along with the external 'Young' loan of 1930, the 'Kreuger' loan, from the Swedish match magnate, in return for a match monopoly in Germany *101. Such expedients are reminiscent of early modern monarchs. And even so, the Reich had to negotiate, with difficulty, advances on these loans from American banking houses *102. The weakness of the government was manifest when in December 1929 the Reichsbank President was able to compel the resignation of Hilferding and his chief secretary (Popitz) *103. After Schacht's own succession by Luther relations were rather better, but it does not seem that the Reich's access to Reichsbank credit actually improved.

4.4. Analysis of the Borrowing Problems of Governments

The difficulty with which local authorities on the one hand, and the Reich on the other floated domestic bond issues, requires some common

* 99 DV III 23/8/29 p 1583.

*100 Wd 14/1(1929) p 1110, 14/2(1929) pp 2216, 2260: DV III 22/2/29 p 653, 26/4/29 pp 988-9.

*101 Eg E Wandel op.cit. p 177; Wd 14/2(1929) p 1858. The Young Loan was also a flop: R E Luke op.cit. p 254-6.

*102 E Wandel op.cit. pp 137, 177. R E Luke op.cit. pp 248ff; G Hardach, Weltmarktorientierung ... pp 110ff.

*103 E Wandel op.cit. pp 137ff; H Muller, Die Zentralbank ... pp 96-8.

explanation *104. From the discussion in Chapter 3 it appears that the major reason was the incomplete recovery of the domestic capital market, especially the bond market, after 1924. Since the long term issues of governments must be bonds, they were badly affected.

I wish, however, in this subsection, to advance and test the hypothesis that domestic public authority bonds were especially disadvantaged after 1924, owing to a deterioration in the 'credit rating' of public households, relative to other classes of bond issue. Many contemporaries noted this deterioration, compared with pre-war. Some attributed it to the political reverses of the state - military defeat, lack of status of the republic, the weakness of parliamentary government and the like *105. A more specific view blamed the fact that the statutory revaluation of the pre-stabilisation debt of public authorities (finalised in 1925) was much meaner than that of private sector debt *106. Broadly speaking, public authorities revalued their own debt at 2½% of its real value; they revalued mortgages at c.25%, mortgage bonds rather similarly, and industrial/commercial

*104 G Hardach's attribution (Weltmarktorientierung ... p 110) of the failure of the Hilferding loan solely to the contemporaneous crisis in the Reparations negotiations fails to account for the failure of the only other post-stabilisation domestic loan of the Reich (Feb. 1927) and of numerous state and local authority flotations.

*105 Centralverband ... Materialien ... pp 52ff. E Wolfgang, Der Neuaufbau ...' p 87.

*106 See Centralverband ... Materialien ... loc.cit.; W Lotz op.cit. p 491; the annual report of the Prussian State Bank noticed in DV III 15/2/29 p 616, 'Die Konjunktur'.

bonds at 15% *107.

This hypothesis can be tested by examination of the changes in the relative yields of bonds of different classes, since 1913. Before doing so, we must note changes in the relative stocks of the different classes (which will affect relative yields if there is imperfect substitutability between classes).

From Table 14 we see that the importance of mortgage bonds, and the bonds of communal mortgage banks, on the domestic market was much greater in the later 1920s than it had been before 1913; at the other extreme the relative importance of industrial/commercial bonds was greatly diminished. This related to the very small proportion

*107 Wd 10/2(1925) p 1124, 'Aufwertung und Anleiheablösung', p 1161, 'Das Aufwertungsgesetz'; E Wolfgang, 'Der Neuaufbau ...' p 89.
The pre-1924 debts of the Reich could (with certain exceptions) be exchanged for a holding in the 'Redemption Debt ('Anleiheablösungsschuld') which was worth (in Rm.) not more than 2½% of the nominal value of pre-1920 debt, and much less of post-1920 debt. This Redemption Debt was only redeemable after 20-30 years (earlier for debt held continuously since before July 1920). There was no statutory obligation to pay interest; in practice 4½% was to be paid retrospectively at redemption. Similar arrangements obtained for state and communal debt.
To obtain the Rm. value of specified private sector debts, one must first calculate what might be termed the 'basic sum' of the old debt held. This 'basic sum' consisted of the nominal value of old debt held continuously since before 1/1/18, and the nominal value deflated by a simple price index, of debt purchased thereafter. For mortgages the Rm. value was to be 25% of the 'basic sum' repayable in full only after 1/1/32, and bearing interest which rose from 1% at 1/1/25 to 5% at 1/1/32. Mortgage Bonds presumably recovered in value as did the associated mortgages. Industrial/commercial bonds were revalued at 15% of the 'basic sum'.
Bank current and deposit accounts were not revalued, but savings bank accounts were, at a minimum of 12½% of the 'basic sum'. Other private sector debts were to be revalued on an equitable basis, to a maximum of 25%.

Table 14 Distribution by Class of Bond, of New Domestic Issues of Bonds and Equity 1901-31. Annual Averages

	1901/13	1924/31	1925/29
Total Issued - Mill.Rm.	1995	2911	3472
Distribution - %			
Mortgage Bonds	22.5	41.2	37
Bonds of Communal Mortgage Banks	1.3	10.4	9
Public Authority Bonds	46.1	14.7	18
Industrial and Other Bonds	10.1	4.1	5
Equity	19.7	29.6	31

SOURCE: Centralverband ... Materialien ... p 45.

Table 15 Domestic and Foreign Stock of post-1924 Bonds of Different Classes Mrd.Rm.

	Stock at Date	Domestic	Foreign	Total
1) Reich	31.03.30	1.7	0.8	2.5
2) States*	31.03.30	0.5	0.4	0.9
3) Local Authorities**	31.03.30	4.2	0.7	4.9
4) Mortgage Bonds	1929	5.4	1.0	6.4
5) Bonds of Communal Mortgage Banks	1929	1.6	0.2	1.8
6) Industrial/Commercial Bonds	31.12.29	1.3	3.1	4.4

* excluding Hanse Cities. ** and local authority associations.

SOURCES: Lines 1) to 3): Konj.Stat.Hdb.(1936) pp 171-2.
Lines 4)and 5): Wd 15/1(1930) p 491.
Line 6): Wi.und.Stat. (1930) p 386.

of mortgage bonds issued abroad (see Table 15), owing to a general legislative prohibition, and to foreign unfamiliarity with this type

of bond *108; conversely in the case of the very high proportion of industrial/commercial bonds issued abroad. Public authorities suffered an intermediate degree of restriction, and this fell mainly on local authorities. Had demand preferences of domestic bond holders been unaltered since pre-war, these differential restrictions on freedom of access to foreign markets, producing such marked alterations from the supply side in the composition of the domestically held bond stock, would surely have caused a marked deterioration in the price of mortgage bonds, relative to industrial/commercial and public authority (especially Reich and state) bonds. But the statistics do not declare this. If we compute the current rate of return (coupon value divided by price) on bonds of identical coupons (assuming identical future price expectations) we obtain the results of Tables 16-18. The yield on mortgage bonds tended to fall relative to that on public authority bonds; that on industrial and other bonds remains the highest *109.

These observations seem to confirm a relative deterioration in the status of public authority bonds. This view receives confirmation in

*108 E Wolfgang, 'Der Neuaufbau ...' p 85; F Speth op.cit. pp 81-2. Only the Netherlands proved receptive to such mortgage bonds as were permitted for overseas issue: Wk 6 (1927) p 232.

*109 The average quality of mortgage bonds deteriorated after the war because of the increase in the number of issuing houses, the smaller average 'size' of issues, and the greater variations in their market prices because of less successful market management; lastly the bewildering variety of coupon types. By contrast the number of separate local authority issues fell: E Wolfgang, 'Der Neuaufbau ...' pp 86-7, 91; F Hartmann, 'Die Verhältnisse am Rentenmarkt' (in Centralverband ... Materialien ... p 48.

Table 16 Current Rate of Return* on Bonds (Arithmetic Averages for Described Samples)

1913 3½% or 4% Bonds			1929 (December) 8% Bonds	
10	3½% Public Authority	4.12%	Public Authority	9.37%
5	3½% Mortgage	4.13%	Mortgage	8.71%
5	4% Industrial	4.25%	Industrial	9.06%

* Coupon Value Divided by Price.

NOTE: 1913 estimates calculated by E Wolfgang; 1929 from the official Stat.Reichsamt indexes.

SOURCE: E Wolfgang, 'Der Neuaufbau ...', Wk 9(1930) p 85.

Table 17 Current Rate of Return* on 6% Bonds - %

	1928	1929	1930
Public Authority	7.08	7.25	7.20
Mortgage	6.90	7.27	7.24
Bonds of Communal Mortgage Banks	6.98	7.40	7.15
Industrial	7.51	7.81	7.57
Average All Bonds	7.02	7.37	7.20

* Coupon Value Divided by Price

SOURCE: Konj.Stat.Hdb. (1936) p 113.

the contemporary comment that bonds of public enterprises in commercial form sold better than the direct bonds of public authorities; so that, according to some, the debt of the German Railway Co. was more saleable than that of the Reich *110. Both Prussia and Berlin in 1929-30

*110 W Lotz op.cit. pp 496-7.

reorganised the commercial form of their enterprises - the latter incorporating private shareholding - in order to improve the capital market status of their debt; otherwise, it was said, the enterprises could not raise new capital *111.

4.5. Conclusion

In this chapter I have traced the emergence of a small but persistent net deficit in the consolidated public household; a deficit which did not diminish at the end of the decade. Fiscal policy did not induce the depression. The quantitative significance of the deficit in respect of employment generation was however small. Its major significance arises out of its uneven distribution, and the difficulty with which those branches of government where it was concentrated financed it. These difficulties had three roots:

i) the limited absorptive capacity of the domestic market for government bonds. This was partly a result of the inadequate general recovery of the domestic market after 1924, but it was aggravated by the deterioration of public credit as a result of defeat, inflation, meagre revaluation of public authority debt, and management of the public finances which, in the eyes of most contemporaries, was poor.

*111 On Prussia: M Schulz-Briesen op.cit. vol. 2 pp 142-4. A similar point about the Recklinghausen AG is made by H Lichtenberg, Hibernia ... pp 146ff. On Berlin O Büsch op.cit. pp 185ff.

ii) the limited access to the foreign bond markets. This applies especially to the states and the communes; the Reich, in the period between the Dawes and the Young loans did not wish to float foreign issues. Foreign absorptive capacity for German public authority issues was limited anyway, but the problem was aggravated especially after 1926, by the restrictiveness and intermittent activity of the Advisory Council for Foreign Credits, by the six-month suspension of the exemption of foreign issues from Capital Yield Tax, and by the adverse criticism of the Agent-General for Reparations.

iii) the Reich had very limited ability to borrow from the Central Bank.

These conclusions have considerable relevance for the understanding of the deflationary policies of the Brüning government during the depression. Even had a government been in office which had wanted to implement a deficit-financed anti-unemployment policy, such a policy could effectively have been financed at best only by enlarging the floating debt of the Reich, at worst by direct money creation by the Central Bank (were its cooperation forthcoming). The focus of the discussion of work-creation projects during those years - on the problem of financing - betrays this *112. The inflation which

*112 Eg W Grotkopp, Die Grosse Krise, pp 129-89: G Kroll, Von der Weltwirtschaftskrise zur Staatskonjunktur, pp 375-400. Cf. contemporary discussion of the (largely abortive) government Work Creation Schemes in Wd 15/2(1930) p 1521, 'Das Arbeitsbeschaffungsprogramm'; 16/1(1931) p 837, 'Arbeitsbeschaffungdurch Auslandsanleihen?' (The financing had to be completely independent of the Reich Treasury). Public Finance remained as precarious throughout the depression as it had become in 1929: E Wandel op.cit. Pt. III passim.

generated a heritage of hysteria about unorthodox fiscal measures, so weakened the capital market and the status of public debt as to have forced the government, had it wished to finance a deficit, to that extremity of unorthodoxy which would most outrage such sentiment. This distinction between the framework within which German and Anglo-Saxon deficit financing would have had to operate is frequently overlooked in discussions of Brüning's policies *113, and may explain why German fiscal policy at this time, not only ex ante, but also ex post, was so deflationary.

*113 Eg H Sanmann, 'Daten und Alternativen ...'.

*114 The Nazi recovery and re-armament involved heavy deficit financing by short term debt. The continued saleability of this at low rates seems to follow from a rapid increase in the money supply (J J Klein, 'German Financial Policies 1932-44') although this is not apparent in the currency stock figures (Hoffmann ... p 815). Perhaps the distributional changes explain this (rise in profits share; relative decline in consumption). Up to 1936 slack in the economy seems to have prevented inflation; thereafter physical controls. See too, K E Poole German Fiancial Policies 1932-9 pp 36-80, 101-55 (especially 143ff.); D Petzina, Die deutsche Wirtschaft in der Zwischenkriegszeit pp 117ff.
After 1948, public sector saving financed the bulk of public sector investment. See below p. 160

CHAPTER 5 A SIMPLE MACRO-ECONOMIC MODEL

5.1. In this chapter I extend and summarise the discussion up to now, by developing a (mainly diagrammatic) model which is capable of explaining the alterations in the behaviour of the key variables listed on pp 8-9 above, over three periods: 1899-1913, 1924-29, and 1950-55. The discussion will be launched with a consideration of the comparative statics of the external balance, will proceed to relate this to the comparative statics of the savings-investment relationship, and thence (via the assumption of fixed domestic and foreign prices) to the internal balance. This last assumption will then be replaced by a verbal dynamic model of wage and price change. Thus the model is a hybrid of static and dynamic elements; inelegant but not, I think, inadmissible. Initially the model will be developed with reference to the first two periods only. A penultimate section will apply it to the period 1950-55. The final section briefly summarises the findings of the chapter.

5.2. The Retardation of Foreign Exchange Earnings

In what respects can the German current account deficit in 1924-29

(in contrast to the surpluses before 1913 *1, and after 1950) be ascribed to an 'exogenous' retardation in the rate of growth of export earnings *2 ?

I define:

(5/1) $B = X_c - Im_c + X_s - Im_s + FI$

where B, X, Im, and FI denote the current account balance, exports, imports, and net factor income from abroad respectively, and the subscripts c and s denote commodities and services respectively.

I now tabulate each, in current prices, from Hoffmann's estimates:

Table 1 Components of the Balance of Payments (Current Account) Annual Averages Current Mill. M/Rm/Dm.

Period	X_c	Im_c	$X_c - Im_c$	$X_s - Im_s$	FI	B
1899/03	4588	5661	-1073	+1071	+416	+414
1904/08	6112	7584	-1672	+1627	+480	+435
1908/13	8246	9726	-1480	+1581	+540	+641
1925	9546	11990	-2444	+462	-6	-1988
1925/29	11520	12714	-1194	+607	-377	-964
1950/55	21524	18176	+3348	-746	-144	+3242

SOURCE: Hoffmann ... pp 817-21.

There is evidence that commodity exports suffered exogenous retardation in the period 1924-29, in the fact that Germany's share of world exports

*1 According to E-A I/6 Die deutsche Zahlungsbilanz pp 130-33, the balance (current account) was negative before the war. This is contradicted by the later estimates of Hoffmann ... p 826, and may be partly accounted for by the exclusion of debt service charges from the former's estimate.

*2 For writers who stress this aspect, see above p 4 .

of finished manufactured goods dropped from 23% in 1913 to 15% in 1925, rising again to 18% in 1929 *3. This was presumably caused by the dislocation of foreign trading relations in the decade 1914-24. Nevertheless there is no sign of deterioration in the commodity balance. In the three pre-war quinquennia shown in Table 1, commodity exports were 81%, 81%, and 85% of commodity imports respectively (at current prices). In 1925-29 the ratio improved to 91%; if we take the peak employment years 1925, 1927, and 1928 alone, the ratio was 83%. From these observations the view receives little support, that after 1924 the Reichsmark was overvalued owing to the deterioration of German international competitivity *4.

*3 E-A I/5 vol. 20/2, Der Deutsche Aussenhandel ... p 30. This study also cites considerable evidence to show that the commodity distribution of German exports was weighted towards growth products, but the geographical distribution (primarily Europe) was weighted towards stagnant markets. Ibid. pp 157, 160, 162, 246, 261, 304.
The view frequently met, that the external balance on goods and services was injured by the territorial losses (usually on grounds of loss of raw material supplies) is less simple than its advocates seem to suppose. One must distinguish
i) the difference before 1913 between the external balances of the areas of pre- and post-Versailles Germany, and
ii) the effect of the war etc. on the external balance of post-Versailles Germany.

*4 G Hardach, Weltmarktorientierung ... pp 35, 161. Compared with 1899-1913 average, German net barter terms of trade were little different in 1925-29 (in contrast to the experience of the UK). Moreover the Import price index fell less, relative to the NNP/GNP deflator than it did in the UK, and, at constant prices, imports failed to rise relative to NNP/GNP, whereas they did in the UK. For data see Hoffmann ... pp 548, 817-8, 826; C H Feinstein, National Income ... pp T8, T14-16, T37-8, T132-3, T139. These observations seem consistent with the view advanced in the text. From E H Phelps Brown and M Browne, A Century of Pay, Appendix 3, we can see that German prices and money wages were lower in 1925-29 relative to 1913 than they were in the UK or USA.

The deterioration in export earnings was clearly worst in the invisible balance and in factor incomes *5. The sharp change in the latter's sign is doubtless initially attributable to the expropriation of German foreign assets at Versailles. Note that this category excludes reparations and was already negative in 1925, before the great capital influx *5A. The deterioration of the services balance may owe much to the expropriation of most of the merchant fleet.

This evidence seems sufficient to establish an exogenous retardation in foreign exchange earnings. But this is not sufficient to explain the deterioration in the external balance. To do this we must first examine the changes in savings and investment.

5.3. Savings, Investment, and the External Balance

Let us consider the alternative national income identities:

(5/2) $Y_f = C + I + G + B - T_i$

(5/3) $Y_f + Tr = C + S + T_d$

*5 Cf. E-A I/6 Die deutsche Zahlungsbilanz ... pp 130-33. This appears to manifest itself afresh in 1950-55, in respect of private transactions. See Table 1 above.

*5A It will be observed that Reparations per se play no part in this analysis. This is because the model considers only net flows on capital account, and, practically throughout the period, the capital inflow exceeded the sum of reparations plus the current account deficit.

where Y_f = Net National Income at Factor Cost
C = Private Sector Consumption at Market Prices
I = Net Investment, of Public and Private Sectors at Market Prices
B = The current account Balance of Payments as defined above (5/1) p 131
T_d, T_i = Direct and Indirect Tax Revenues respectively
G = Government Current Expenditure at Market Prices
Tr = Transfer Payments by the Government
S = Private Sector Saving

By substituting (5/3) into (5/2) and rearranging, we obtain:

(5/4) $B = PuS + S - I$

where $PuS = T_d + T_i - Tr - G$ = Public Sector Saving

That is, as a matter of definition, the external balance is equal to the difference between public plus private sector saving, and domestic investment. Furthermore, denoting two periods by the superscripts 1 and 2, we can write:

(5/5) $B^2 - B^1 = (PuS^2 - PuS^1) + (S^2 - S^1) - (I^2 - I^1)$

If therefore the balance of payments deteriorates from one period to another, then, as a matter of definition, either the rate of investment must have increased, or the rate of public and private sector saving have diminished.

I now tabulate the magnitudes in (5/4) for the UK and Germany in selected periods 1899-1959, at current prices. See Table 2.

In the case of the UK we can see that the vigorous growth of investment in 1925/29 compared with pre-war was not completely matched by the increase in private saving (public sector saving being small), and hence the external surplus on current account was reduced. But

Table 2 National Accounting Magnitudes in the UK and Germany
Annual Averages Current Prices

Period	B	I	PuS	S	Y	T
1) UK £mill.						
1899/03	38	207	-40	285	2072	117
1904/08	117	167	8	276	2218	185
1909/13	195	168	7	359	2496	195
1925/29	47	472	16	503	4846	439
1951/59	-37	2568	473	2058	16999	3394
2) Germany/Federal Republic of West Germany Mrd M/Rm/Dm.						
1899/03	+0.4	4.6	0.3	4.7	32.5	2.4
1904/08	+0.6	6.3	0.1	6.9	40.2	2.9
1909/13	+0.6	7.2	0.6	7.3	48.5	4.3
1925/29	-1.0	8.4	1.2	6.3	75.3	12.9
(1925,7,8)	(-2.0)	(10.6)	(1.1)	(7.6)	(77.3)	(12.8)
1951/59	+4.1	24.9	11.7	17.3	134.7	33.1

METHODS: Estimates of B, I and PuS can be obtained from the sources described below. S was then derived as a residual via expression (5/4).

SOURCES: UK: C H Feinstein, National Income, Expenditure ..., pp T8-11, T35, T37-8, T40-1.

Germany: Hoffmann ... pp 763-4, 801, 803, 804-7, 817-9, 826. To the estimates of public saving on pp 803, 807, had to be added the net increase in the assets of the social insurance institutions (for comparability with the UK).

in the case of Germany we note that a sluggish increase of investment between these two periods was matched by some increase in public sector saving, but stagnation in the level of private saving *5B; so much

*5B A lower savings rate is asserted by K Borchardt, 'Wachstum und Wechsellagen ...' p 690, and by D Petzina, Die Deutsche Wirtschaft ... p 95, and linked with low bond prices. See too D H Aldcroft, From Versailles to Wall St. pp 144-5.

so that the sign of the external balance was reversed.

If we regard public sector savings and, for the moment, investment as exogenous, then it is on the behaviour of private savings in the two countries that we must concentrate.

The theory of savings is implicit in the theory of the consumption function. Most modern theories *6 broadly agree (as far as concerns this argument) in relating intended consumption to expected long-run (or permanent) earned income, and to current net wealth. It would be expected that, in the long run, for an entire society an increase in disposable income would be matched by an absolute increase in saving (though not necessarily in the same proportion). The UK data in the above Table evidently conform to this expectation; the German data do not.

A first explanation for the non-conformity of the German data could be statistical. If the estimates of the external balance (B) and investment (I) are too low then savings too will be understated. The investment data are the less exact, but I know of no general reason for believing them to be underestimates *7.

If there was <u>in fact</u> no increase in the level of savings between 1909/13 and 1925/29, a second explanation might be that realised incomes were below expected incomes throughout the latter period, and hence

*6 See eg H G Johnson, <u>Macroeconomics and Monetary Theory</u> pp 23ff; M Lovell, <u>Macroeconomics</u> pp 105/7.

*7 For fuller discussion see p 238 below. Contemporary estimates of B were rather low, but this was rectified in the data I use. See E-A I/6 <u>Die deutsche Zahlungsbilanz ...</u> pp 63-5.

savings (in the short run a residual between intended consumption and actual income) were 'temporarily' depressed. However, even in the peak employment years 1925, 7 and 8, realised savings scarcely exceeded those of the last pre-war quinquennium, when national income had been about 50% lower. Moreover, if, as is usually presumed, long-run income expectations are governed by past experience, what was there in the experience of the decade 1914-24 to lead the public to regard income levels in 1924-29 as temporarily depressed?

Thus, it seems to me that 1924-29 (or at least its peak years) must be treated as representing a 'long-run' situation. In such a situation the decline in savings relative to earned income would best be explained by i) a rise in the value of assets relative to earned income. This may possibly have occurred in the UK (increase in government debt net of loss of foreign assets), but in Germany the near obliteration of both types of 'outside' asset - government and foreign debt - suggests that, on the contrary, asset values fell severely *8. ii) a reduction in the rate of growth of population which would reduce desired social savings rates, according to the 'life cycle' savings hypothesis. But this pan-European phenomenon cannot explain a specifically German observation *8A.

It appears therefore that in order to reconcile the observed behaviour

*8 Since the obliteration of 'inside' assets merely effects a wealth redistribution, its effect on expenditure would presumably be small. In some cases however (eg industrial bonds) it may have stimulated investment at the expense of consumption.

*8A Borchardt, 'Wachstum ...' p 690, attributes it to changes in the income distribution. There is too little empirical evidence on this, to follow it up; furthermore the accepted theory of the consumption function would not put much weight on this factor.

of savings with the accepted consumption function, we must postulate a shift of the function: that at any given level of 'long-run' income and of wealth, the desired rate of saving was less in 1925 than it had been before the war *9.

Thus, given that imports are an increasing function of income, it is possible to explain how that, despite retardation of export earnings and, even more, of domestic investment, income levels rose so strongly as to generate a level of imports which created an adverse balance of payments *10.

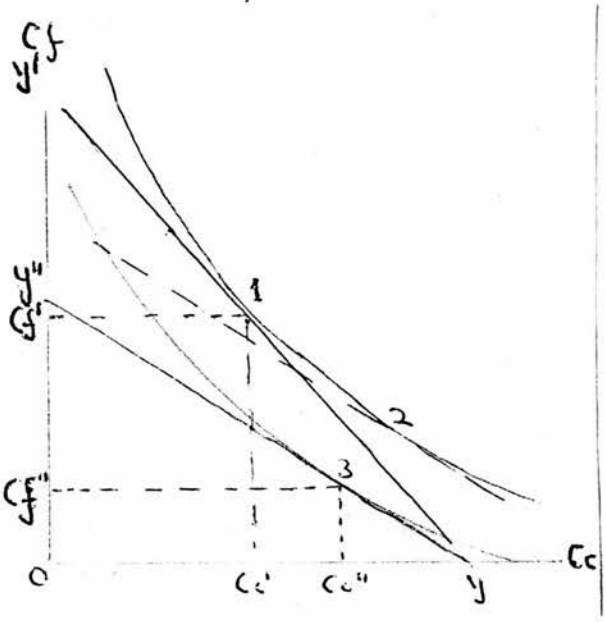
5.4. Excursus: An Underpinning for the Savings Function

To validate the above account, the postulated shift in the savings function must be substantiated. Suppose (to start with) that only

*9 A contemporary consensus held that the savings rate had fallen. This was partly an inference from the theory by which they explained the high interest rates (see p 47 above), but was also, if imperfectly, substantiated from statistics of growth of savings deposits etc. See eg E Welter, 'Die deutsche Kapitalbildung', in Wk 7(1928) pp 301ff. There he explains low savings by reference to a backlog of consumer demand, and taxation. The latter point was researched, albeit inconclusively, in a symposium: G Colm and H Neisser (eds), Kapitalbildung und Steuersystem.

*10 A simple counterfactual exercise which applies the average pre-war savings function: $S = 0.17(Y_f - T_d)$ to the 1925-29 period, but uses the observed 1925-29 import and tax functions: $Im = 0.17Y_f$ and $T_d = 0.12Y_f$ predicts that, given the 1925-29 observed average values of X I and G, Y_f would have been 15% below its observed levels, and B have been slightly positive. Thus, in this crude model, an exogenous fall in exports cannot of itself account for the external deficit. Were investment regarded as a function of the level of income, the external balance would be even more active.

households save, and that they do so only by accumulating assets of fixed money value. In effect they choose between two types of expenditure: current consumption, and future consumption. The memory of the inflation would have the effect of reducing the (certainty-equivalent) future consumption which households would expect to gain by sacrificing a specific amount of current consumption. The consequences of this altered trade-off can be analysed in the familiar terms of its substitution and income effects. The former effect will encourage households to consume more now at the expense of less in the future; the latter will effect a reduction of both current and expected future consumption *11. See the diagram below:



Cf (vertical axis) represents future consumption measured in certainty-equivalent units. Cc horizontal axis) shows current consumption.
OY is income. YY' depicts the initial trade-off between current and future consumption. Under this, given the indifference curves, Cc' is consumed, and Cf' saved.
When increased uncertainty alters the trade-off line to YY", point 2 shows the substitution effect; point 3 (Cc",Cf") the final equilibrium, with saving falling more than current consumption.

Diagram 5/I

*11 If households were 'target' savers (as eg the 'life-cycle' hypothesis might imply), an increase in uncertainty would redouble their saving efforts, and the above theory is inapplicable. The observed fall in savings might be explained as a 'lag' effect - owing to the persistence of inflation-bred habits, but in this case, how would the reduction in the desired savings rate during the inflation be explained?

The actual case is complicated by the fact that income increased between the two periods (ie the intercept of the trade-off line with the horizontal axis moved out). If the original line is read to represent a 'blown-up' version of the pre-war trade-off on a post-war scale, the diagram can be applied *12.

Perhaps a sufficient increase in interest rates would so have improved the trade-off as to negate the substitution effect of increased uncertainty. The presence of foreign purchasers of German debt would however prevent a sufficient rise *12A.

To what types of household saving may this hypothesis be applied? Households save in four main ways:

i) by accumulating cash balances,

ii) by lodging deposits with financial institutions,

iii) by buying marketable debt, especially iii/1) bills and bonds and iii/2) equity,

iv) by purchasing consumer durables.

The hypothesis seems applicable to all categories except the last, (and complements the analysis of the effects of uncertainty on financial markets, in Chapter 3) subject to the following reservations: Firstly, equity purchase might be considered exempt.

*12 NB also that the 'family' of indifference curves in Diagram 5/I is drawn on the assumption of unchanged net assets. Where these diminish, the slope of the curves at the interception with any vertical line becomes flatter; the perceived reduction in certainty-equivalent future consumption must be so much the more severe to offset this increased willingness to sacrifice present for future consumption.

*12A Assuming that foreign aversion from German financial assets increased less than did domestic. See pp 79-80 above.

However, in normal theories of portfolio selection, equity cannot replace the (unobtainable) risk-free debt as a portfolio base. Moreover the uncertainty bred by the decade 1914-24 was not confined to inflation. Profits, dividends and share prices also fluctuated wildly; bankruptcy crises and the fragility of the stock market thereafter have already been mentioned; all these indicate the potential illiquidity and the inadequacy of equity as a substitute vehicle of saving.

Secondly, liquidity preference would encourage a movement into short term debt, and cash. But a relative increase in liquid savings for this reason will probably accompany a reduction in overall savings *13.

Thirdly, savers could have substituted foreign for domestic debt and, to a degree, they did *14. In view of the recent expropriation of the large part of German foreign assets, and continued vacillation of the US authorities about the rights of German citizens to the rest of their assets there, it is hardly to be expected that this would be viewed as an adequate alternative method of saving.

We are left therefore with the fourth category of saving. From the logic of the argument, I conclude that consumer purchases of durables increased. This is hard to verify. In any case this form of saving is statistically counted as consumption. Up to now I have assumed that only households save. Saving by firms can be categorised in the same fourfold way, except that under iv) the purchase of investment

*13 This may explain why statistics of growth of savings deposits did not altogether display the retardation that contemporaries expected. See *9 p 138 above.

*14 Especially in short term form. For references see *53 p 72 above.

durables should be substituted. The first three are governed by the same influences as in the case of households. Did direct investment of retained earnings rise to compensate for the fall in the other types of saving? Much was written in the 1920s about internal financing (Selbstfinanzierung) and 'concealed investment' (stille Investionen) *15. Nevertheless there are good grounds for believing that this form of saving was under pressure in 1924-29, because of a strong wages push. This will be examined in section 5.6. of this chapter. Thus the internal savings of firms were probably little greater than they had been pre-war *16. The literature on internal financing was probably generated by awareness of the increasing difficulty of market financing.

To summarise: the savings function I envisage involves a high demand both for liquidity (doubtless aggravated by Reichsbank policy) and for commodities. Both of these demands were satisfied by a large scale sale of debt, which spilled over to abroad and

1) financed the import of money (the 'second Reichsbank' *17) thus satisfying the increased demand for money;

2) financed the external deficit in goods and services, thus satisfying the increased demand for commodities.

*15 See pp 149ff below.

*16 Hoffmann ... p 785 shows a higher rate of reserve-building by Aktiengesellschaften in 1925-29 than before 1913. But the importance of the AG as a form of enterprise had also greatly increased, especially in the inflation. Borchardt, Wachstum und Wechsellagen ... p 706 believes business savings were smaller than before 1913.

*17 See p 30 above.

5.5. A Static Macro-economic Model

5.5.1. I now try to fuse the discussion of the external balance and the savings function with the financial model described on pp 76ff above, and a tentative investment function, to obtain a simple diagrammatic explanation of the changes in macro-economic structure between pre-1913 and 1925-29. The model here contains three major simplifications.

Firstly the government sector is suppressed, on the hypothesis that changes in the fiscal balance or in the absolute size of the sector are immaterial to the problem in hand.

Secondly, the supply of interest-bearing debt (but not of money) is assumed to be exogenous. An endogenous relation, while more correct would complicate, but not, I think, materially alter the argument.

Thirdly, domestic and foreign prices are assumed to be fixed. This temporary assumption is relaxed in the next section.

A complete list of symbols is given on p viii. The following additional symbols require definition:

E = net accumulation of gold and foreign exchange
U = an indicator of uncertainty of expectations
Y* = expected output (or income) level
K = extant capital stock
i = cost of finance to the investor in physical capital.

I now add savings/investment, foreign trade, and price relationships to the model of the financial sector on pp 76ff and to the identities on pp 133ff above:

(5/6) $I = I(i,Y^*,K)$ $\quad I'(i),\ I'(K) < 0;\quad I'(Y^*) > 0.$

The rate of investment is a decreasing function of the cost of finance, and of the size of the inherited capital stock, and an increasing function of expected output.

(5/7) $S = S(Y,U)$ $\quad S'(Y) > 0;\quad S'(U) < 0.$

The rate of savings is an increasing function of the level of income, and a decreasing function of the degree of uncertainty of expectations.

(5/8) $X = \overline{X}$ Exports are exogenously determined.

(5/9) $Im = Im(Y)$ $\quad Im'(Y) > 0.$

Imports are an increasing function of the level of income.

(5/10) $Pd = \overline{Pd}$)
(5/11) $Pf = \overline{Pf}$) The domestic and foreign price levels are fixed.

(5/12) $B - Bexp + F - E = 0$

The net external surplus on current account (B), minus the net surplus on capital account, including reparations, (Bexp - F), minus the net increase in gold and foreign exchange (E) is identically equal to zero.

(5/13) $S - I = B$ This is (5/4) p 134 , simplified by the suppression of the government sector.

5.5.2. The six panels of Diagram 5/II (P 145) seek to summarise the model. Panel (i) depicts investment as a decreasing function of the cost of finance. When income decreases (or inherited capital stock increases), the entire function shifts vertically down. Savings are ex hypothesi not a function of the cost of finance, but of income, as depicted in Panel (ii). With an increase in uncertainty, less is saved at each level of income: the function shifts rightwards. In Panel (iii) imports are depicted as an increasing function of income; exports exogenous. The difference between realised savings

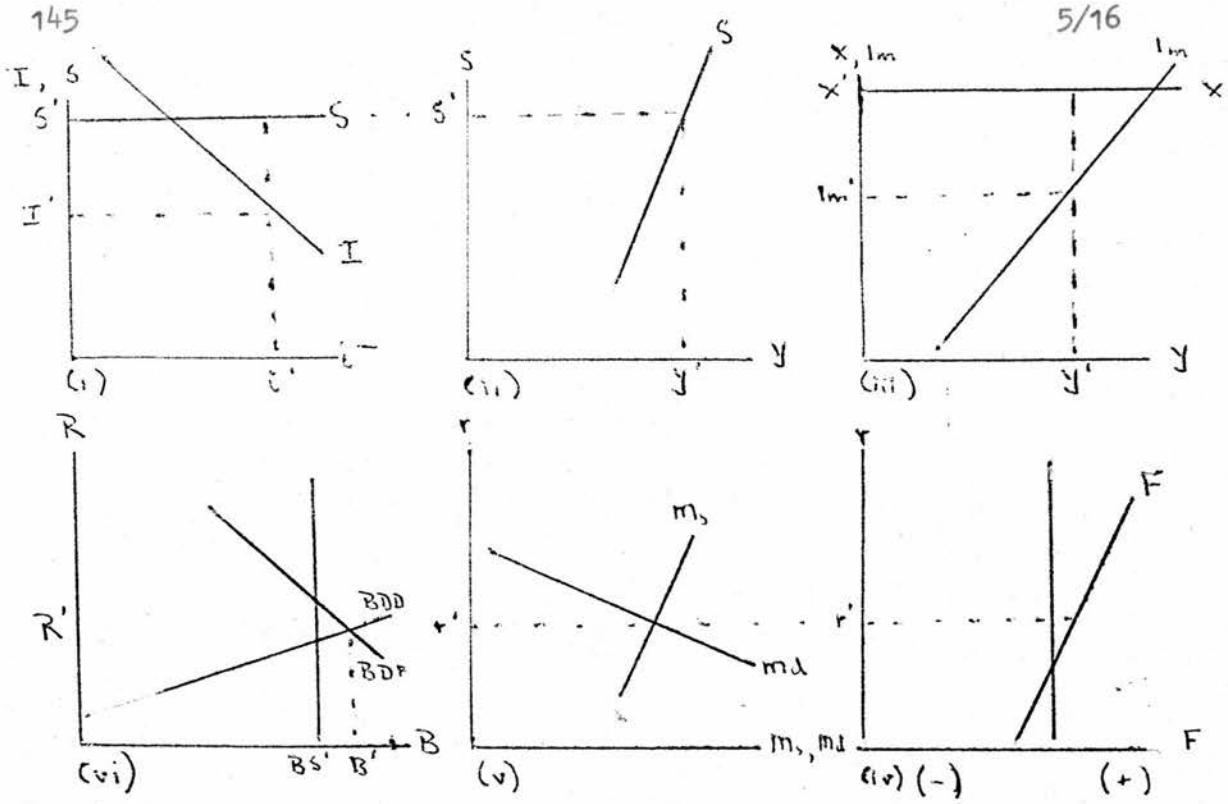


DIAGRAM 5/II : 1899-1913

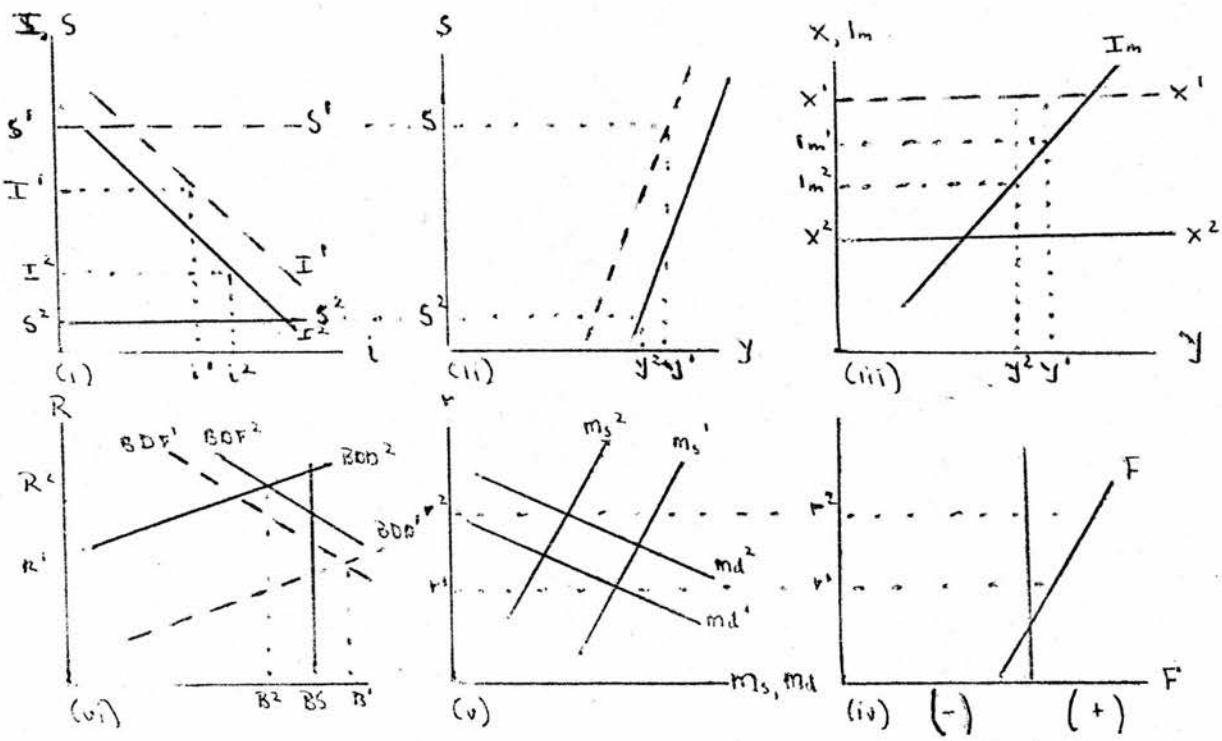


DIAGRAM 5/III : Superscript ^{1} (Dashed Functions) 1899-1913
Superscript ^{2} (Continuous Functions) 1924-9

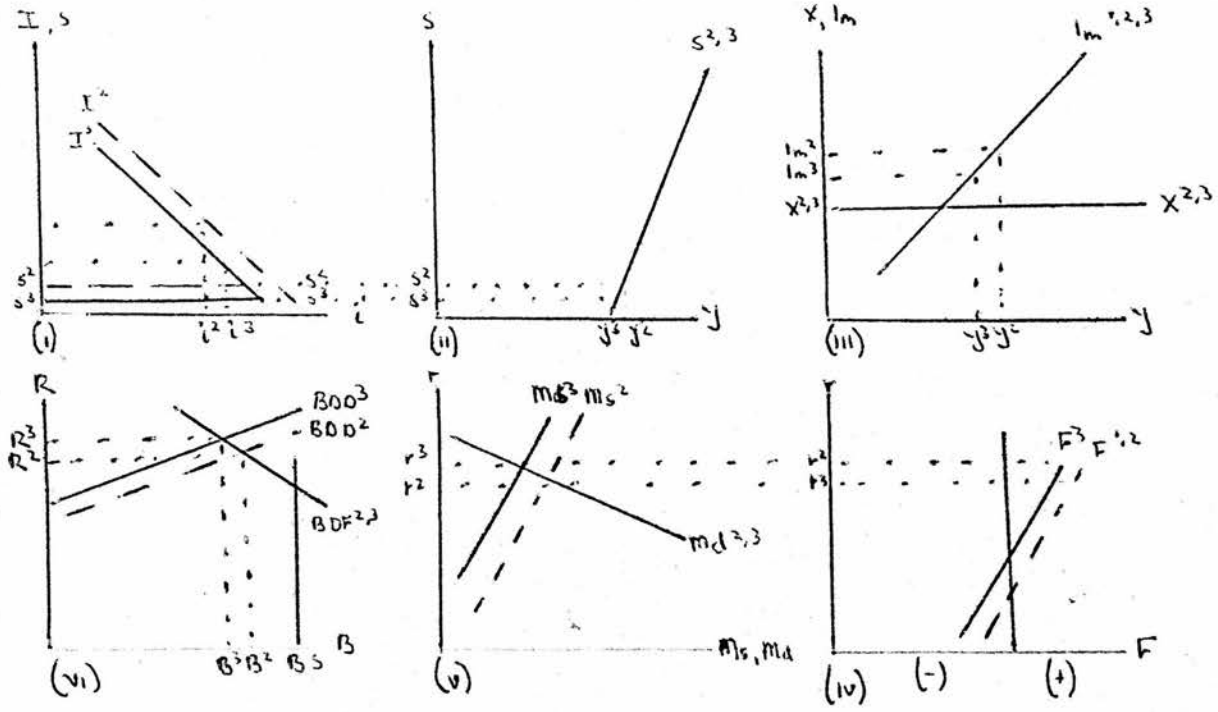


DIAGRAM 5/IV : Superscript 2 (Dashed Functions) - without consideration of 'autonomous' effect of monetary policy. 1924-9.

Superscript 3 (Continuous Functions) -, with consideration of 'autonomous' effect of monetary policy 1924-9.

and investment in Panel (i) must, according to expression (5/13) above, be equal to the gap between exports and imports in Panel (iii). This is effectuated via Panel (ii), by movements of income. Panels (iv) to (vi) have already been explained in chapter 3 (pp 78-9) *18. The links between the real and the financial sectors are: Firstly, as expressed in (5/12) above, the link between the capital inflow and the current account external balance. Capital inflow is depicted in Panel (iv) and, in a complex way, Panel (vi); (see p 80 above and

*18 Panels (iii) and (iv) of Diagram 3/II p 78 have been coalesced into Panel (vi) of 5/II above, for simplicity. Thus this represents both the distribution of the holdings of existing and of new bonds.

*18 on the previous page). To the extent that gold and foreign exchange reserves do not alter, Reichsbank policy must adjust bill rates to equate these. Secondly the link between bond yields and the cost of finance. If businessmen are not risk averters, then, as borrowers, they will discount the uncertainty component of high bond yields. But they probably were risk averters to some degree. It is upon this assumption that this part of the argument is predicated.

Diagram 5/II summarises the structure of the pre-1913 economy. Given the savings function, the level of investment and exports created an income level such as produced a balance of payments surplus on current account. Demand and supply of money determined a bill rate which produced a small inflow of short term credit. But the demand for bonds was such that, given the domestic and foreign supply, Germans steadily enlarged their net holdings of foreign bonds, not however so vigorously as to exhaust the gold and foreign exchange made available by the current transactions and the short term inflow *19. The equilibrium bond price created a cost of finance which ratified the level of investment hypothesised at the start of the paragraph. In seeking to progress from this representation of the pre-1913 economy to the post-1924 economy, I have utilised an intermediate mental concept - a scaled-up version of the pre-1913 economy, on a post-1924 'scale'. Thus Diagram 5/II can now be viewed as representing this intermediate concept, and we can speak of a reduction of exports, rather than a retarded growth, and so on.
Diagram 5/III reproduces (in dashed lines) the functions from 5/II,

*19 Germany was a persistent importer of gold and foreign exchange in this period. See Hoffmann ,... p 817.

and superimposes the hypothesised function shifts of the 1924-29 period (in continuous lines). Confining our attention to Panels (i) to (iii) it is clear that the reduction in exports plus the rightward shift in the savings function suffice to explain the external deficit, without reference to the financial sector, but not the fall in investment (because income levels would not fall) *20. But the theory is incomplete, because the effect of the deterioration of the balance of payments on interest rates and hence on cost of finance is ignored.

Widening our attention to include the financial sector, we must therefore hypothesise that bill rates rose in response to the deteriorating external balance (Panel (iv)), and that the domestic demand-for-bonds function shifted upwards, both because of the rise in bill rates, and especially because of the increase in uncertainty, analysed in Chapter 3. Since the domestic demand for German bonds shifted further than the foreign, foreigners became large holders of German bonds. One point remains uncertain. Did the rise in bond yields raise the cost of finance (as depicted in 5/III Panel (i)), thus throttling back investment? Chapters 6 to 8 will substantiate the hypothesis that the cost of finance did depress the long run level of investment over the period 1924-29 as a whole (though changes in the cost of finance had less immediate short run effect in the 1928-29 recession).

*20 The sufficiency of a shift in the savings function plus export reduction to explain the reverse of sign of the current account balance can be exemplified in a linear model of the 'real' economy, under most plausible assumptions. Cf *10 above. The downward shift <u>of</u> the investment function is a secondary, feedback effect. The increase of the cost of finance causes a downward shift <u>along</u> the investment function. This induces a multiplier reduction in income which, in turn, induces the downward shift <u>of</u> the investment function.

Diagram 5/III seems to me to provide a tolerable approximation of the observed shifts in the macro-economics structure. A final feature is added however in Diagram 5/IV. Here I assume that bill rates rose not only sufficiently to attract the short term inflow needed to offset the net deficit on other 'autonomous' components of the balance of payments, but that Reichsbank policy raised them even higher, thus raising both bond yields and (I hypothesise provisionally) the cost of finance somewhat more. Investment is therefore somewhat lower, hence also income and the external deficit are somewhat reduced. But this does not feed back to reduce bill rates again, because the effect of the 'initial' excessively high bill rates is to induce a dependence on foreign short credits which causes the net inflow of foreign credits at any given bill rate to fall through time- expressed in the upward shift of F(r) in Panel (iv). The alterations in functions and in values of variables, thus induced by Reichsbank policy, are denoted by superscript ^{3} in Diagram 5/IV.

5.6. Price and Wage Determination

The patently arbitrary assumption of fixed domestic and foreign prices must now be removed. I now allow that domestic prices vary relative to foreign; ie eliminate (5/10) and substitute for (5/8) and (5/9)

(5/8*) $X = X(\bar{X}, Pd)$ $\quad X'(Pd) < 0$

(5/9*) $Im = Im(Y, Pd)$ $\quad Im'(Y) > 0;\ Im'(Pd) > 0$

Exports and imports are also decreasing and increasing functions respectively of the domestic price level, given the foreign price level.

What price determination function will substitute for (5/10) in such a way as to preclude an adjustment of domestic, relative to foreign prices, which would eliminate balance of payments disequilibria? Those who have considered this question have generally rationalised (5/10) - "prices are sticky in the short run" - and coupled this with the argument that the Reichsmark was overvalued, presumably fortuitously, at the currency stabilisation in November 1923. *21

This formulation seems to me to put the cart before the horse. It appears to be derived from the contemporary British 'return to gold', whereby allegedly an overvalued dollar rate was superimposed upon a system of 'sticky' prices and wages, thus necessitating a deflationary policy, the miners' strike, and a gentle downward drift of prices after 1925.

The German case is however not analogous. When the mark was stabilised, the last thing that could be predicated of wages and prices was stickiness! Thereafter, prices actually tumbled 15% (Frankfurter Zeitung index) or 20% (Stat. Reichsamt index) to the end of January 1924 *22. Then they rose a little (especially in manufactures) to May - even though unemployment in the trade unions exceeded 25% in February and 9% in May. When a stable price level emerged, the external value of the currency was a datum, not vice versa. And if prices could tumble so radically, why not a little more? Why did prices

*21 eg G Hardach Weltmarktorientierung ... pp 24, 34; also G Hardach, 'Zur Politischen Ökonomie ...' p 25. W Fischer op.cit. p 46 states that a devaluation would have eased the problems of the external balance. Alterations in the level of tariff protection (as against pre-war) seem to have been slight. These are discussed in C-D Krohn Stabilisierung ... pp 174-89.

*22 Wk 3(1924) p 17.

actually begin to rise when unemployment was still so severe?

It seems to me that an investigation of wage and price dynamics is required. Table 3 below provides some raw materials for this.

It can be seen that, comparing Germany with the USA (where unemployment was no greater), the NNP deflator and money (and real) wages rose much faster in Germany, and that the wage/income ratio (ie roughly wages share of income generated in industry and commerce/manufacturing) rose in Germany, but fell in the USA. The pattern exhibited in the UK (where unemployment was much worse than in Germany) resembles that of the USA. So would the Swedish data (where unemployment never exceeded 3%, according to Maddison *22A), had I reproduced Brown and Browne's data on that country. Only in France, which had both an inflationary history and very low unemployment, was the German price and wage behaviour reduplicated. Thus, in that country where, to judge by interest rates, monetary conditions were at their most deflationary, we get the clearest indication of inflationary pressure in the commodity and labour markets! Considering German data alone, we note that the biggest wages explosion occurred in 1924-25, (see Table 3f, col 1) when unemployment was probably 4-7% of the labour force, and that wage increases mounted again as unemployment fell in 1927-29. Finished goods prices failed to respond to the fall in import prices *23; however the rise in prices, plus productivity, failed to match that of money wages, so that, as noted above, wages

*22A Also E Lundberg, Instability and Economic Growth, p 32.

*23 The import price index fell from 139 in 1924 to 129 in 1929: Hoffmann ... pp 613, 625. But export prices are believed to have risen from 133 to 136 in the same period. Ibid. p 607.

Table 3 Unemployment, Prices, Wages, and Wage-Income Ratios Germany, France, UK, and USA

(G = Germany; F = France)

a. Unemployment %

	G	F	UK	USA
1913	1.9	1.0	1.2	4.3
1925	3.0	-	6.4	3.8
1926	8.0	1.1	7.1	1.9
1927	3.9	-	5.5	3.9
1928	3.8	-	6.1	4.3
1929	5.9	-	5.9	3.1

b. Money Wages (1925-29=100)

	G	F	UK	USA
1913	63	15	52	45
1925	89	82	101	99
1926	93	96	99	100
1927	99	99	101	100
1928	106	104	99	101
1929	113	120	100	102

c. GNP/NNP Deflator (1925-9 = 100)

1913	72	17	60	58
1925	94	79	105	102
1926	89	102	102	102
1927	101	104	99	100
1928	108	104	98	99
1929	109	112	97	99

d. Real Wages (1925-9 = 100)

1913	91	85	82	77
1925	93	107	98	98
1926	96	96	96	98
1927	98	94	103	100
1928	103	99	101	102
1929	108	105	103	103

e. Wage-Income Ratio (%)

	in Industry and Commerce	in Manufacturing	
	G	UK	USA
1913	59	63	58
1924			
1925	58	69	70
1926	60	70	67
1927	59	70	70
1928	63	71	68
1929	62	70	66

f. Other German Data

	Money Wages	Industrial Finished Goods Price Index	Man-Days Lost in Strikes (mill.)
	(1913 = 100)		
1924	107	156	36.4
1925	135	157	17.1
1926	146	150	1.3
1927	154	147	6.0
1928	168	159	20.3
1929	190	157	4.5

SOURCES: a: A Maddison, Economic Growth ... p 220; cf discussion p 8 above.

b-e: E H P Brown and M Browne, A Century of Pay pp 434-452 (Appendix 3)

f: Col 1: G Bry, Wages in Germany p 462; col 2: Konj.-stat.Hdb. (1936) p 104; col 3: St.Jb.f.d.Dt.R. 1930 p 329.

share increased.

A 'wages push' formulation of the problem springs naturally to mind. Certain proferred explanations - eg that the labour force sought to re-establish its 1913 relative international real wage, or was subject to the delayed action of the same forces which raised wages share of manufacturing income during 1914-24 in other countries *25 - must be rejected until some mechanism is specified to relate them to the actual bargaining process. We must approach the specification of wage determination more directly. What model fits best? Bilateral monopoly? But trade union membership was less than 20% of the total labour force *26. A price leadership model? Certainly the big salary increase of the civil service in 1927 *27 is believed to have had general repercussions. The widespread use (often legally

*25 eg E H Phelps Brown and M Browne op.cit. p 249; and K Borchardt, 'Wachstum ...(p 690).

*26 Comparing T U membership data in Bry op.cit. p 32, with labour force data in Hoffmann ... pp 205-6. Less than 40% of the work-force in mining, manufacturing, transport and communications was unionised. Even in Iron and Steel, two-thirds of the labour force was unorganised: H-H Hartwich, Arbeitsmarkt, Verbände und Staat, p 196. Thus contemporary complaints about the cartellisation of the labour market (eg Wk 7(1928) p 343, 'Lohnniveau und Kapitalbildung') seem as myopic as like complaints about the commodity market.

*27 See above pp 95-6 .

obligatory) of the state arbitration service *28 ? This was what employers tended to blame *29.

None of these 'institutional' theories can explain the fact that the wages push was at its strongest in 1924-25 when unions, collective agreements and the arbitration service were at their weakest *29A. Nor will they explain the international variations described above.

The new 'micro-economic theory of employment and inflation' seems to me to provide a simpler and better resolution of this puzzle. In this theory *30 every wage and price agreement is ~~a~~ in effect

*28 H H Hartwich op.cit. provides a detailed examination of this hypothesis. See especially pp 30-42. His conclusion is a cautious acceptance of the view that the arbitration may have reinforced wage demands, in the industrial sector only (pp 193-220). He also notes that in the period of greatest wage rises (1924-25), unions, collective agreements, and hence arbitration were at their weakest. His main thesis seems to be (summarised pp 385-8) that the arbitration system gave workers a kind of socio-political guarantee in the Weimar Republic (of which labour unions were a pillar which had otherwise so signally failed to achieve the high worker aims of the 'revolution'. His 'counterfactual' (p 388, also p 359), appears to be that in the absence of the arbitration system, labour and capital relations would have erupted into severe social conflict: but the expected net effect of this on wages is not specified.
The general view that the lack of a political consensus affected social policy and labour relations runs through the discussion in Mommsen, Petzina, Weisbrod, (eds) Industrielles System ... pp 352-60.

*29 The celebrated Ruhr lock-out of Nov.1928 was really an expression of this. See U Hullbusch, 'Der Ruhreisenstreit', passim; H H Hartwich op.cit. pp 245ff.

*29A See eg C S Maier, Recasting Bourgeois Europe pp 444ff.

*30 E S Phelps, A A Alchian et al. Microeconnomic Foundations ... (esp. introduction by Phelps); E S Phelps, Inflation Policy and Unemployment Theory pp 3-80.

a forward contract for an expected period, and b) concluded in the context of perceived partial information (because both parties believe that the opportunity cost of further search exceeds the improvement in contract terms it is likely to yield). b) can be expressed another way. In every contract negotiation participants maintain a 'reservation price' above/below which they will not go; they would rather renew their 'search'. Furthermore, given a), the reservation price on both sides will be higher, the higher the expected rate of inflation.

However the realisation of buyers' and sellers' expectations depends on the exogenous determinants of aggregate demand. If eg a deflationary policy is applied, buyers' demand (at unchanged reservation prices) will recede. Sellers will experience what they take to be random reductions in demand, and prefer, initially, to maintain prices and let orders and inventories, then output, take the slack. This last will induce a 'multiplier' reduction in aggregate output. After some time, buyers' and sellers' reservation prices will fall, as will the rates of inflation they expect, so that ultimately a new equilibrium at a new level of output and price expectations will be established.

In equilibrium, different rates of expected inflation are consistent with roughly identical levels of normal full employment. Thus, in the labour market, there exists a family of 'Phillips curves', each attached to different expected rates of inflation, and each more or

less vertical displacements of each other *31. Where experienced inflation exceeds/is less than expected, unemployment will be less than/exceed the 'normal' rate.

This model seems to be of direct application to the German case, especially to the labour market. Rather than picturing the worker as entertaining a definite probability distribution of expected inflation rates, it seems more appropriate to view him as acting under 'Shackleian' uncertainty, but aware of the possibility that inflation could break out again at any time, and hence taking vigorous precautions to prevent his wages from again being caught in the ever-widening adjustment lag that so depressed them in 1919-23. Hence the very high wage increases (and strike activity) of 1924, depicted in Table 3. While these lessened in the 1925-27 recession period, money wages continued to rise despite high unemployment. Following the 1927 upswing, wage increases and strike activity recovered in 1928-29, though not to 1924 levels: an expression of the adjustment of expectations *32.

Can price behaviour be similarly explained? The most relevant price index seems to be that of industrial finished goods (Table 3f p 152). This is less clearly consistent with the hypothesis. Three consider-

*31 E S Phelps, Inflation Policy ... pp 35-57 (the responsiveness of the 'natural rate of unemployment to variations in the equilibrium inflation rate which he discusses is, in this context, minor). See too R J Gordon, 'Recent Developments in the Theory of Inflation and Unemployment' pp 48ff.

*32 For contemporary comment see eg Wk 6(1927) pp 137; 7(1928) p 135ff; (articles 'Die Löhne'). Wk carried regular quarterly reviews of wage developments from 1924 - mid-1927, and these returned on an irregular basis in 1928-29.

ations seem relevant.

i) A price in most markets is less clearly a forward contract than is a wage - it is more readily revisable. Hence, under uncertainty, price-setters may not have felt the same need as wage earners to anticipate possible inflation.

ii) Business suffered a constraint on its ability to resist price cuts not felt, in the short run, by labour: the threat of bankruptcy, or, more generally, the disruption of markets by the intrusion of bankrupts' stocks sold for what they will fetch *33. The low levels of liquidity in the economy, and the consequent bankruptcy waves made this a material factor. See Table 4 below.

iii) Foreign competition was a constraint on price-raising in the goods market, without counterpart in the labour market, especially in periods of domestic demand recession (1925-26 and 1928-29).

Contemporaries were aware of severe inflationary pressure in the goods markets in the immediate post-inflationary period *34.
Prices rose slowly through 1925; fell in the bankruptcy wave of 1925/26 *35; then recovered strongly in 1927-29.

*33 Reference to the Konj.Stat.Hdb.(1936) pp104-7 and the St.Jb.f.d. Dt.R.1926 p444, 1927 p411, 1928 p460, 1929 p355, and 1930 p399, shows that in periods of recession (esp. 1925-26) price falls and numbers of bankruptcies were severest in the consumer goods and trade sectors. Regrettably, data on the industry-distribution of bankruptcy by value of debt is unobtainable for the period.

*34 Cf. Wd 9/1(1924) p113, 'Preise und Löhne seit der Stabilisierung'. C-D Krohn op.cit. calls this 'profit psychosis' - pp 58,68.

*35 But Wd 11/1(1926) p181, 'Geldpolitik und Preisabbau' argues that the inflation mentality had prevented prices from falling hitherto. It continues "Es muss die Inflationsgewohnung überwunden werden, die einen beginnenden Konjunkturanstieg durch schnelle Preiserhöhungen wieder drosselt, anstatt ihn durch Umsatzvergrösserungen bei gleich bleibenden Preisen voll ausreifen zu lassen."

Table 4 Annual Bankruptcies: Number of Proceedings (000s)
Value of Debt (mill Rm)

	Proceedings	Value		Proceedings	Value
1921-22	2.9	-	1927	7.9	242
1924	8.0	-	1928	10.6	398
1925	14.8	572	1929	13.2	597
1926	15.8	467	1930-32	16.3	655

SOURCES: St.Jb.f.d.Dt.R. 1922 p 342ff; 1924/5 pp 385ff; 1926 pp 443ff.
Konj.Stat.Hdb. (1936) pp 157-8.

Table 5 Industrial Finished Goods Price Index 1913 = 100

	1924	1925	1926	1927	1928	1929
1st q.	159	153	157	142	157	158
2nd q.	164	156	152	144	158	158
3rd q.	151	159	145	149	160	157
4th q.	151	159	143	154	160	156

q. = quarter

SOURCE: St.Jb.f.d.Dt.R. 1927 p 301; Konj.Stat.Hdb.(1936) p 104.

Thus, to sum up, I hypothesise that expression (5/10) should be replaced by a set of dynamic relations determining wage, and, to a lesser extent price, change as an increasing function both of the expected rate of inflation, and of the level of excess demand in the relevant markets. In the absence of deflationary policies, it seems to me that wage pressure would have been intense; a balance of payments surplus transitorily achieved by a low initial exchange rate would have been quickly eroded *36.

*36 This view was expressed in 1924 by K Singer, Wd 9/1 (1924) pp 221-3, 'Starres oder Elastisches System'; further 9/2(1924) pp 909-13, 'Zur deutschen Währungspolitik'.

The model requirements specified on pp 8-9 above have now been met except in respect of the explanation of the severity of the cycle. This seems capable of being linked with the greater illiquidity of the 1924-29 economy than of that before 1913 or after (as shall be seen) 1950 - hence its proneness to bankruptcy waves, and sensitivity to credit squeezes. It is also linked with an inventory cycle. This will be returned to in the following chapters.

5.7. Application of the Theory to the Federal Republic 1950-55

Can the above theory explain why the inflation produced by the Second World War was not followed by a state of the economy as unstable as that of 1924-29?

Firstly we might note the differences in the styles of the inflations. "[In] the open inflation of the 1920s, the continuity of the market system was maintained; it remained legal. In the suppressed inflation of the 1940s, the system as a whole was suspended; that is, it remained as illegal as it had become with the evolution of the war economy" *37. On this basis I would expect the 'expectational aftermath' of the second inflation, given the incoherence of its 'black' and legal markets, and the general economic dislocation, to have been less definite than that of the first. (In any case the memory of the abrupt ending of the former inflation would colour expectations

*37 H Menderhausen, Two Postwar Recoveries in Germany p 40. (see section pp 32-44).

of price increase after 1948).

Secondly, after the Second World War, and even allowing for the smaller area of the BRD, one can suppose that there was an exogenous increase in foreign exchange receipts, relative to the capacity of the domestic economy, both because of the general buoyancy of world trade, and because of the unrequited inward transfers (Marshall Aid); the counterpart of the great cut in net invisible earnings decreed at Versailles *38. The improvement in the external balance thus induced would have been negated by the huge increase in the domestic investment ratio *39, had it not been for the substantial increase in the savings ratio, reported in Table 2 p 135 above. From this Table we note first of all the dramatic rise in public sector savings - a much noted feature of German recovery *40. Still, private sector savings also increased greatly. Commentators are agreed that this was almost entirely a reflection of the massive increase of earnings retained by firms *41, and only to a small extent the result of saving by households; this habit having been impaired, it is alleged,

*38 Menderhausen op.cit. pp 11, 13, 92-109; A Maddison, Economic Growth in the West pp 166ff.

*39 Menderhausen op.cit. pp 48ff. The same can be inferred from Hoffmann ... p 826.

*40 Menderhausen op.cit. pp 75ff; H Wallich, Mainsprings of the German Revival pp 155ff; K W Roskamp, Capital Formation in West Germany pp 138ff; Maddison op.cit. p 239.

*41 Menderhausen op.cit. pp 75ff; Wallich op.cit. pp 156ff; Roskamp op.cit. pp 82-7. D Keese, 'Die volkswirtschaftliche Gesamtgrössen ... p 66; Hoffmann's estimates of business reserves (pp 785-6) are consistent with this.

by recent inflation experience *42. This merely puts the question one stage back. What was it that permitted the higher rate of business saving in the 1950s than in the later 1920s? Tax policy was designed to encourage this (up to the mid-1950s) *43. But surely a much more significant factor was the decline in labour's share of income generated in industry and commerce. Part of the reason for this was slower rise in German money wage rates, relative to that abroad than in the 1920s. See Table 6a overleaf. This could be ascribed to the confused inflation experience mentioned above; or to the presence of a socio-political consensus whereby labour determined not to 'rock the boat' *44. Or lastly, to the higher rate of unemployment in the 1950s, produced by the vast influx of refugees *45. As important however as the modest degree of wage pressure was the rapid rise of productivity. This was a conjoint result of high investment rates and low capital-output ratios *46. Since capital-output ratios rose in the later 1950s, and productivity growth slackened (but not investment rates) the consensus affirms that this rapid productivity growth reflects 'once-for-all' aspects of the recovery from post-war chaos (without parallel during

*42 Roskamp op.cit. pp 87-110; Wallich op.cit. pp 32-3; Borchardt, 'Wachstum und Wechsellagen,' p 728. Uncertainty, rather than definite inflation expectations, must be blamed for the decline in individual savings.

*43 Wallich, Roskamp, locis cit. *41.

*44 Wallich op.cit. pp 12, 291ff; Menderhausen op.cit. pp 62-7.

*45 Wallich op.cit. pp 288ff. For comparative unemployment data see Maddison op.cit. p 220.

*46 Wallich op.cit. pp 54ff; Menderhausen op.cit. pp 76-7.

Table 6 Wages Share, and Data relevant Thereto: 1950-55

a. Money Wages: Various Countries 1952-59 = 100
G = Germany; F = France; S = Sweden

	G	UK	USA	F	S
1950	66	67	74	49	59
1951	76	73	82	65	70
1952	82	79	86	76	82
1953	86	84	91	78	85
1954	89	89	92	84	90
1955	95	98	97	92	98

b. Productivity Indices 1952-59 = 100

c. Wage-Income Ratios in Industry/Commerce

Manufacturing

	G	UK	USA	S	G	UK	USA	S
1950	75	91	89	89	81	71	71	56
1951	82	92	89	91	76	76	71	50
1952	85	91	93	91	75	79	74	61
1953	89	95	95	94	75	79	75	60
1954	95	99	95	94	74	79	75	60
1955	102	101	102	97	72	81	73	62
1959	115	108	109		70	80	75	58

SOURCE: E H P Brown and M Browne, A Century ... Appendix 3, pp 431ff.

1924-29) *47.

The market in long term securities was as badly injured by the second as by the first inflation - or worse *49. The much greater level of [illegible]

*47 Wallich loc.cit.; Borchardt, 'Wachstum ...' p 732. The relatively fast growth of productivity adds an endogenous element to the explanation of export growth.

*49 Menderhausen op.cit. p77; Wallich op.cit. pp 184ff; Roskamp op.cit. pp98ff, 132ff. Capital issues were very low, but this is partly because of the legislative restriction of long term issuing rates to 6% - to help housing finance. Hence we can infer the bond-bill gap which a free market would have exhibited. Two inflations in 25 years would affect the bond market worse than the labour market.

of business, and public sector saving however rendered investment financing independent of the capital market; in marked contrast to 1924-29.

Two final points:

i) Whereas in 1924-29 unemployment of labour was conjoined with underutilisation of the capital stock *50, after 1950 unemployment seems to have coexisted with more or less full utilisation of the capital stock *51. This doubtless helps to explain the high investment rates of the later period.

ii) Monetary policy was, on balance, restrictive. The discount rate of the Bank Deutscher Länder was 4% from July 1949 to October 1950. Thereafter 6% to April 1952, after which it dropped slowly to 3% by June 1954. Quantitative controls were added to the standard tools. *53 Since, unlike the later 1920s, the underlying Balance of Payments structure did not (after 1950) compel a dear money policy, the policy of the BdL can scarcely be judged less restrictive than that of the Reichsbank *54 - at least up to later 1953. But the inconvertibility of the currency enabled the BdL also to control short

*50 See below pp 253ff.

*51 A F Mester, 'Eine Zeitreihe der Ausnutzung des Sachkapitalbestandes' p 81 sets utilisation at capacity level for the whole of 1950-59. This seems more realistic than the utilisation levels reported by R Krengel (Anlagevermögen, Produktion und Beschäftigung ...' pp 86-9, doubtless produced by mechanical application of his method - and inclusion of partially damaged stock.

*53 Wallich op.cit. pp 63-106, especially pp 89, 97, 103.

*54 The currency stock grew only slightly faster in the later period. Hoffmann ... p 825.

term capital inflows better than its predecessor could in the 1920s *55.

5.8. Summary

In this chapter the deviation of the macro-economic structure during 1924-29 from that obtaining before 1913 and after 1950 has been explained chiefly in terms of 1) an exogenous reduction in foreign exchange earnings; 2) a downward shift in the savings function largely for endogenous reasons (household savings - owing to the expectation of renewed inflation; business savings - to wages pressure); 3) a disruption of the capital market, owing to inflationary expectations which caused a) borrowers and lenders to prefer short term transactions, and b) a large inflow of foreign funds; 4) continued inflationary pressure, especially in wages; to a lesser extent in the goods market; 5) excessively restrictive Reichsbank policy.

*55 Menderhausen op.cit. pp 82-91. Fiscal policy was also restrictive: ibid; also Wallich op.cit. pp 63-106; Borchardt 'Wachstum und Wechsellagen ...' p 736.

CHAPTER 6 INVESTMENT IN THE PUBLIC AND SEMI-PUBLIC SECTORS

6.1. Introduction

In the chapters up to this point I have been aiming to build up descriptions of certain principal operating parts of a macro-economic system, and finally (in Chapter 5) to assemble these parts and display the system working. This was a comparative-statics system, whose object was to account for leading features of the period 1924-29 as a whole, not to account in detail for cyclical movements within that period. However, it provides a general framework within which this cyclical analysis can be conducted. To this I now turn. The next four chapters are devoted to a short-term sector by sector analysis of the investment function. In the end I hope, by this analysis, to be able to ascertain more exactly the causes of the 1928/29 reduction in real economic activity, which heralded the depression.

In this chapter I seek to summarise the behaviour of investment in the public and related sectors. These comprise:

i) The public household. Unlike all the other sectors here considered, this class of investment is already included in the aggregates of public household expenditure considered in the last chapter. Investment under this head comprises buildings for the use

of government departments (at all levels), including educational, recreational and welfare facilities (Öffentliche Gebäude); secondly, civil engineering works such as roads, canals, harbours, sewage and drainage works (Öffentlicher Tiefbau); finally, all investment by public enterprises run as government/local government departments ('in eigener Regie').

ii) Transport and Communications. This comprises chiefly the investment of the German Railway Co. (Deutsche Reichsbahn Gesellschaft), the Post Office (Deutsche Reichspost), both of which after 1924 were operated as independent Reich-owned enterprises *1, and also publicly owned local rail or tramway networks. These make up 80% of the statistical category. The other 20% was made up by related investments of the private sector, viz. private railways, omnibuses and freight vehicles, all shipping (including fisheries), air traffic and radio *2.

iii) Public Utilities. These included a very large element of publicly owned enterprise, as well as enterprises of mixed public/private ownership, some of which were very large, eg the

*1 See above p 82 footnote *3.

*2 See St.Jb.f.d.dt.R. 1938 p 564. Hoffmann ... classifies railways under a separate head. Where the latter places the Post Office is hard to discern. Presumably omnibuses etc. come under 'Gewerbe'.

Rheinisch-Westfälische Elektrizitätswerke *3. It should be noted that data concerning this sector refer only to plants producing electricity, gas and water for general consumption, outside of the producing enterprise. In the case of electricity, such works will be referred to as the public electricity supply; analogously for gas and water. Where these things were produced for consumption within the enterprise only, the investment in question is classified according to the branch of the sale product of the firm.

iv) Housebuilding. This important class of investment is related to the public sector because in this period about half of its finance was estimated to come from that source; also because of rent control on pre-1924 property. See below p 198 *3A.

The Table following shows estimates of the aggregate annual investment activity of each of these classes. Thereafter four sections of the chapter consider each in turn. A final section briefly educes tendencies common to all.

*3 According to one estimate in 1930, 57% of the public electricity supply was generated in plants entirely owned by the public sector. Of these, one half came from plants owned by the Reich and States, and one half from plants owned by the communes. Only 11% was sold from completely privately owned works. Erich Kolling, Die Elektrizitätswerke in Deutschland ... p 18 (ultimate source: Reichsverband für Elektrizitätswerke). See too E-A III/2, Die deutsche Elektrizitätswirtschaft, p 68.
Of 1201 gasworks producing gas for public sale in 1928, 981 were communally owned, 78 'mixed', and 150 private: E-A III/1, Die deutsche Kohlenwirtschaft p 38.

*3A Cf. D Petzina, Grundriss der deutschen Wirtschaftsgeschichte 1918-45 p 732.

Table 1 Public and Semi-Public Sector Investment

A From Hoffmann: NET INVESTMENT

	1 Public Buildings	2 Public Civil Eng.	3 Railways	4 House-buildings	TOTAL 1 - 4
	1913 Prices Mill.Rm.				
1924	220	-	-	900	-
1925	220	294	210	1000	1654
1926	250	378	260	1360	2108
1927	340	553	230	1530	2563
1928	360	483	210	1535	2483
1929	370	455	120	1395	2245
1930	280	341	240	970	1741
	Current Prices Mill.Rm.				
1925	380	450	300	1705	2750
1926	420	590	370	2165	3410
1927	570	890	340	2570	4220
1928	630	820	310	2680	4260
1929	660	800	190	2480	3960
1930	480	580	370	1655	2930

B From Statistische Jahrbücher: GROSS INVESTMENT

	1 Public Admin.	2 Public Utilities	3 Transport*	4 House-buildings	TOTAL 1 - 4
	Current Prices Mill.Rm.				
1924	1407	432	1279	982	4100
1925	1859	757	1650	1712	5978
1926	2285	855	1709	1940	6789
1927	2690	727	2167	2622	8206
1928	2658	1023	1931	2825	8457
1929	2670	1083	1800	2877	8430
1930	2092	748	1512	2442	6794

* excl. undertakings 'in eigener Regie'. These are found under 2.

SOURCES AND METHODS: See overleaf.

Notes to Table 1

SOURCES A: Hoffmann ... pp 258, 260; pp 236-7, col. 1 'Gebäude'.
B: St.Jb.f.d.dt.R. 1938 p 565.

METHODS (references): A: Hoffmann ... pp 228-31, 249, 250ff.
B: G Keiser and B Benning, Kapitalbildung und Investitionen in der deutschen Volkswirtschaft 1924-28, pp 181ff, 200-201, 201ff.

NOTES ON METHOD: In Hoffmann, public buildings investment is takenfrom Stat.Reichsamt estimates of building activity (then netted against some depreciation scheme); public civil engineering from analysis of consolidated public household accounts, on the assumption that the cameralist category of 'extraordinary expenditure' corresponds to 'net investment' (against this assumption, see Keiser and Benning op.cit. p 201).
In the Statistische Jahrbücher estimates of public administrative investment (incl. undertakings 'in eigener Regie') were compiled by detailed examination of ordinary and extraordinary accounts of public households for items that satisfy the economic concept of 'gross investment'.

Investment by the German Railway Co. derives in both cases from the 'Statistik der in Betrieb befindlichen Eisenbahnen Deutschlands', modified, in the case of the St.Jb. estimates, by reference to the Annual Reports and other data of the Company.

Local Railways, Public Utilities, Reichspost: in the Statistische Jahrbücher estimates derive from balance sheet analysis (detailed description below pp 210ff). Hoffmann subsumes public utilities under 'Gewerbe', local railways under 'Railways'; I am not sure where the Post Office appears. In the first two categories he follows the methods of the St.Jb., applying his own depreciation scheme.

Housebuilding: Both sources use the Stat. Reichsamt housebuilding statistics, based on the records of the building police (Baupolizei). Estimates of numbers, sizes and quality of dwellings completed, partly built, and renovated in the year were converted to monetary estimates by application of indexes of building costs.
NB to obtain Hoffmann's full estimates of housebuilding, half of 'agricultural building' must be added to 'non agricultural housebuilding'. See references above.

Periodisation: Columns A2 and B2 probably refer in reality to the financial year; the rest probably to calendar years. See pp above.

6.2. Investment of the Public Household

From Table 1 we observe that in aggregate this class of investment (cols. A1, A2, B1) follows a pattern similar to that of total public household expenditure (cf. Table 2 p 91 above), but with an earlier turning point: whereas total public expenditure in current prices rose to 1928/29, and maintained a plateau during 1929/30, public household investment levelled off from 1927/28. The earlier end to the increase in investment probably reflects the greater flexibility of this type of expenditure in the face of financial constraints *4.

If Hoffmann's estimates (culled from different types of source) are valid, then public household investment in the years 1927-29 was characterised by offsetting trends: an increase of investment in buildings and a decrease in public civil engineering *5. This seems to be connected with the fact that public civil engineering investment was mainly the responsibility of the communes, as Table 2 below shows (if line 1 is assimilated to 'public buildings' and line 2 to 'public civil engineering').

It follows from the discussion in Chapter 4 *6, that already by later 1927 communes as a class were in financial straits; the Reich

*4 Annual estimates of net investment in, and repair and maintenance of highways (Landstrassen) tends to confirm this hypothesis: Wi.u.St. 1937 pp 330-332.

*5 Stat.Reichsamt estimates of gross investment in road building confirm this latter. According to the St.Jb.f.d.dt.R. 1938 p 564, it reached a peak of 629 mill.Rm. in 1927; 547 mill.Rm. in 1928; 536 mill.Rm. in 1929. Also *4 above.

*6 esp. pp 101ff. Cf. K D Hansmeyer (ed.), Kommunale Finanzpolitik p 137.

not until 1928/29; hence perhaps the earlier decline in the net investment pertinent to the former.

Table 2 Distribution of Public Household Net Investment between Levels of Government 1925-27 Mill.Rm.

	Reich, States Hanse Cities	Communes, Communal Associations
1. General Administration, Defence, Education	476	144
2. Roads, Harbours etc, Social, Sanitation	648	2241

SOURCE: G Keiser and B Benning op.cit. p 156.

NB Different depreciation schemes vitiate comparison with Table 1A.

According to the Stat.Reichsamt data the issue of permits for the construction of new urban public buildings levelled off in 1928 (see Table 3 below). The same data however indicate that 25% fewer urban

Table 3 Public Buildings: Permits and Completions in 90 Cities (except as specified)

	Permits				Completions			
	1927*	1928*	1928	1929	1927**	1928**	1928	1929
IQ	120	106	108	91	98	105	107	70
IIQ	178	168	168	112	79	134	135	66
IIIQ	187	134	142	134	98	104	111	100
IVQ	154	148	144	84	130	132	134	147

NOTES: Permits may be viewed as proxies for intentions
* 89 cities ** 92 cities

SOURCE: Wi.u.St. 1929 p 86; 1930 p 129.

public buildings were completed in 1929 than in 1928. Except on implausible assumptions, this seems incompatible with the evidence of Table 1 *7. It will be noted again below that the statistics of urban building permits and completions seem to exaggerate the contours of the cycle exhibited by more comprehensive data *8.

6.3. Investment in Communications

6.3.1. I shall consider firstly the German Railway Co.; secondly the other publicly owned railways; and thirdly the Post Office. Some more detailed estimates of investment follow in Table 4.

6.3.2. Before discussing railway investment expenditure, attention must be drawn to the fact that the cyclical pattern displayed by Hoffmann's estimates (Table 1A col.3), with its peaks in 1926 and 1928, runs counter to that of any other estimates I know (cf. Table 4 above) and to contemporary discussion. Perhaps this is a consequence of his depreciation scheme *9 (so that his data gives a misleading

*7 A partial reconciliation may be 1) the delay between the completion of buildings and the entering of the expenditure in budget accounts; 2) the effect of the severity of the winter of 1928/29 in delaying public building completions in to 1930. Both points are speculative.

*8 See pp 193ff .

*9 Is it significant that his rather brief discussion of his depreciation schemes uses railway investment as an example? Hoffmann ... pp 216ff.

Table 4a Gross Investment in Communications 1925-30
Current Prices Mill.Rm.

	1 Reichsbahn	2 Local Railways	3 Reichspost Airways, Radio
1925	818	167	401
1926	858	169	441
1927	1135	203	370
1928	937	289	306
1929	842	273	362
1930	797	153	295

Table 4b Railway Gross Investment (excluding Local Railways and Tramways) Current Prices Mill.Rm.

		1926	1927	1928	1929	1930
1 Net	Reichsbahn	346	459	285	201	196
2 Investment	Other	7	14	24	17	13
3 Replacement	Reichsbahn	387	412	420	445	413
4 Investment	Other	22	23	23	23	22
TOTAL		762	908	752	686	643
5 Mainten-	Reichsbahn*	299	338	293	332	310
6 ance	Other	14	15	15	15	14
TOTAL Lines 1 - 6		1075	1261	1060	1033	967

* estimates

SOURCES: 4a: St.Jb.f.d.dt.R. 1938 p 564.
4b: Wi.u.St. 1937 pp 330-332.

indication of the pattern of gross investment). It is justifiable, I think, to follow the witness of the other sources in analysing railway investment *9A.

*9A The contours of Tables 4a and 4b, with their 1927 peak, are confirmed by current and constant price statistics of expenditure on maintenance, renewal and improvement of the Company's physical assets, circulated to members of its Finance Committee in a memo dated 31.12.29. BA Nachlass Silverberg 497.

The consensus of contemporary *10 and subsequent *11 opinion seems to hold that the physical assets which the German Railway Co. inherited in 1924 were in large measure obsolete and otherwise inadequate, as a result of low investment rates in the decade 1914-1924. However, the only quantitative evidence I have does not support this view. It relates to the locomotive stock, and implies that renewal and expansion of the stock was very rapid in this decade, so that by 1924 there was a considerable excess. See Table 5 below. If the locomotive stock in 1927 was on average somewhat older than in 1913, this was probably a result of low renewal rates in the years 1924-26 *12. Some contemporaries doubted the urgency of the Reichsbahn renewal programme in the later 1920s *12A.

The degree of obsolescence of the railway capital stock must therefore remain an open question.

However, even in the absence of any net investment, the internal financial stability of the Railway Co. was precarious. To analyse

*10 Letter from Director Jahn (of Railway Co.) to P Silverberg on 24.2.28, in BA Nachlass Silverberg 481. See also Reichsbahngericht, Entscheidungsgründe ... p 17.

*11 R E Lüke, Von der Stabilisierung zur Krise, pp 102-107; P Czada, Die Berliner Elektroindustrie ... p 153. According to a footnote in the latter source Reichsbahn investment 1920-23 was 585 mill.Gold M. as against 750 mill.M. p.a. in 1913-14. But how reliable is either?

*12 The locomotive stock may be exceptional: it is remarked on in DV 25.5.28 p 1143. The Dawes Commission however believed the assets of the Co. to be highly modernised (R E Lüke op.cit. pp 102ff): were they more biassed than those who had to pay the Reparations?
There seems no good reason why the Railways could not have financed an investment programme during the inflation. As a dept. of the Reich they would have access to unlimited Reichsbank credits.

*12A IHZ 19.10.27, p 1, 'Braucht die Reichsbahn Kapital?'

Table 5a Locomotive Stock (Reichsbahn): Gross Changes and New Orders 1910-29. Numbers p.a. or Annual Averages

	1910/13	1914/19	1920/22	1923	1924
Gross Additions	1280	1790	1990	1031	442
Numbers Scrapped	600	240	1550	1552	604

	1925	1926	1927	1928	1929
Gross Additions	363	116	135	430	-
Numbers Scrapped	2520	1815	1156	900	-
New Orders	-	196	310	101	23
Orders Outstanding from Previous Year at 1.1.	-	-	176	376	45

Table 5b Age Distribution of Locomotive Stock in 1913 and 1927 % of Stock of ... age (in years)

	3	4 - 6	7 - 12	13 - 18	19	Average Age
1913	12%	15%	26%	21%	27%	12.8 years
1927	1%	14%	38%	24%	23%	13.5 years

SOURCE: Maschinenbau 8 (18.4.29) pp W 85- W 88.

this, we must first recollect the place of the company in the economy of Reparations. After 1924 the Company had to raise out of its operating revenues the sums shown in Table 6a, line 6 below. It was in order to ensure that the levy genuinely arose out of operating revenue that the Dawes Commission recommended that its management be vested in an Aktien Gesellschaft owned by the Reich, and further stipulated that the ratio of current operating expenditure (including maintenance and renewal) to operating revenue ought not to exceed

80% *13. From Table 6a, line 5 however we see that in fact this ratio never fell below 81%. In good part this reflects the competition of road transport, but there were other more accidental reasons *14.

Out of the operating surplus (Betriebsüberschuss - Table 6a, line 3) the company had to accumulate certain legally required reserves, meet depreciation charges, pay dividends on the preference shares it issued from time to time, and meet Reparations Charges *15. This is shown in Table 6b. After 1925 this surplus, even before expenditure on renewal of equipment etc, was barely adequate to this, let alone to finance net investment expenditure.

Under these circumstances, the Company had two sources of outside finance. Firstly, the Reich might buy preference shares or grant loans. Secondly, the domestic capital market might do the same. The fact of the primacy of Reparations charges on the Company made foreign issuing difficult. In practice, only short term foreign borrowing came into question *16.

Up to the end of 1925 the impossibility of domestic loan flotation confined investment expenditure to narrow limits. The opening of the

*13 R E Lüke op.cit. pp 99ff. In practice the control of the Reich extended to pricing and borrowing policies; the company's independence was therefore limited.

*14 Wd 13/1(1928) pp 205ff, 'Die Finanzlage der Reichsbahn'. Also Reichsbahngericht op.cit. pp 12-15. Among other reasons was the heavy pensions burden, a consequence, it was alleged, of the politically motivated overstaffing of the post-war years.

*15 Ibid. pp 3-11, 17.

*16 Letter of P Silverberg (member of the Verwaltungsrat - Administrative Board - of the Company) to O Wassermann (Deutsche Bank) dated 7.1.28: BA Nachlass Silverberg 540. DV 6.1.28 p 412 opines that Reparations charges impeded domestic borrowing too.

Table 6a German Railway Co. Operating Surplus and Charges upon it. Current Prices Mill.Rm.

	1925	1926	1927	1928	1929	1930
1 Operating Revenues	4669	4541	5039	5159	5354	4570
2 Operating Expenses[1]	3452	3234	3438	3646	3834	3496
3 Operating Surplus[1]	1217	1317	1601	1513	1520	1074
4 Renewal of Plant	523	459	721	648	660	594
5 Ratio of Expenditure to Income ie (2 + 4):1 %	85	81	83	84	84	90
6 Reparations Charges	333	574	591	658	659	660
Remainder of Surplus	362	286	290	207	201	-180

Table 6b German Railway Co. Operating Surplus and Charges upon it. Current Prices Mill.Rm.

	1925	1926	1927[2]	1928[3]
1 Operating Surplus	1217	1317	1587	1363
2 Renewal of Plant	523	457	656	(660)
3 Reparations Charges	333	574	591	(660)
4 To Statutory Reserves	93	91	100	(102)
5 Depreciation	115	140	157	-
6 Dividends on Preference Shares	3	40	62	(90)
7 Other Interest Payments	0	0	2	(3)
	1067	1302	1568	(1515)
8 Net Surplus	151	15	19	-
9 Surplus brought forward from Previous Years	3	153	167	(-152)

1 For my purposes I define 'operating surplus' net of renewal of plant.

2 These were provisional estimates made in first half of 1928.

3 Forecast of Railway Tribunal.

SOURCES: Table 6a: Wi.u.St. 1932 p 411
Table 6b: Appendices to Reichsbahngericht, Entscheidungsgründe ... (1928 forecast from pp 9-10 of text).

NOTE TO TABLE 6b re DEPRECIATION: The coverage of line 5 Table 6a is patchy; it relates to only certain new structures and sundry rights and other assets (eg the company's operating rights in view of its obligation to return the assets to Reich clear of debt in 1964 - see Wd 15/1(1930) pp 801ff). Because of its semi-cameralist bookkeeping, no comprehensive depreciation of balance sheet assets was calculated. Following the Tribunal (Reichsbahngericht) I regard 'renewal of assets' as a proxy for depreciation; its concyclicality (see Table) means however that 'net surplus' (line 8) is less concyclical than true profits would be. Whether, on average, renewals reflect the correct level of depreciation, is hard to assess. It incorporates certain items that have the character of net investment - and the Co. recognised this by displaying these in its balance sheet under additions to assets; on the other hand many other items, if not currently being renewed, are excluded. Contemporary assessments differ. The Tribunal definitely believed it understated depreciation - but understood depreciation to cover technical improvements. See Reichsbahngericht, op.cit. pp 3-7.

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domestic capital market in 1926 permitted an expansion of investment activity, and the 407 mill.Rm. capital expenditure of that year proved fairly easy to finance *17. As a result of this no doubt, a six-year investment programme was announced late in the year *18. But the large scale placement of preference shares, by which it had been hoped to finance the programme, had to be cancelled in the aftermath of the Reich loan failure of February 1927 *19. The programme of 1927

*17 Letter from Railway Director Jahn to P Silverberg (cited in *10 above). Cf Reichsbahngericht, Entscheidungsgründe ... Appendix, part C, and DV 10.6.27 p 1149 145 mill.Rm. was raised by sale of preference shares to Reich, 76 mill.Rm. by credits sold on stock market, about 35 mill.Rm. generated internally. An added stimulus was the work creation programme, in which the Co. was expected to participate: Vorläufiger Reichswirtschaftsrat ... pp 3,5-6,12. An expenditure of 120 mill.Rm. had been proposed for it, to be financed by loans.

*18 Vjh.Konj.forsch. 1927 H1 pp 45-6.

*19 Wd 13/1(1928) pp 205ff (cit. *14).
See too the letter Jahn/Silverberg cited *10. On the Reich loan failure see above p.35.

had to be financed out of the previous year's surplus (see Table 6b, line 9 p 177), out of c.130 mill.Rm. sundry credits, and 34 mill.Rm. out of current internal funds *20. In later 1927 the Company began to feel the burden of the civil service salary increase in which it was, willy nilly, involved *21; in addition, Reparations charges were to rise by 100 mill.Rm. in 1928. In the absence of adequate access to external finance the Company felt that these added burdens compelled it to cut back its investment programme *22: in fact in early 1928 it did succeed in placing a further 200 mill.Rm. preference shares, but as this was inadequate even for the restricted investment programme now envisaged, the Company petitioned the Reich for a price increase that would raise revenue by 250 mill.Rm.p.a. *23. The government entertained a rosier view of likely revenue development and borrowing possibilities in the second half of 1928 than the Company did, so refused the application *24, but a Railway Tribunal (Reichsbahngericht) subsequently awarded the increase on grounds of the already-described inadequacy of the internally generated surplus *25. And in fact the surplus did not improve in 1928, despite the price increase *26.

*20 Reichsbahngericht, Entscheidungsgründe ... Appendix C.

*21 Ibid. pp 8-9, and Appendix C. The full impact was expected to raise costs c.300 mill.Rm.p.a.

*22 DV 7.12.27 p 260; Wd 13/1(1928) pp 205ff (cit. *14). Letter Jahn/Silverberg cited *10.

*23 Reply of Reich Government to Application of German Railway Co. concerning the Raising of Railway Tariffs. Sent to Silverberg 8.8.28. BA Silverberg Nachlass 541.

*24 Ibid.

*25 Reichsbahngericht, Entscheidungsgründe ...

*26 Cf. estimates for 1928 in Tables 6a and 6b p 177 .

Further substantial external financing proved impossible after early 1928, until the Company received its slice of the Young Loan (c.240 mill.Rm. - received 1930-31); this however was required for consolidation of existing debt. In late 1929 the Reich launched a new Work Creation Programme, in which the Railway Co. was to increase investment spending by c.350 mill.Rm., to be financed, as the work progressed, by a series of bond and bill issues. In addition, the Reich undertook to cancel certain debts to itself, and to subsidise the servicing of the above issues *27. This programme doubtless explains the high expenditure forecast for 1930.

W Frank, in Wirtschaftsdienst expressed himself sceptically about these grandiose loan-financed schemes, and in fact they seem to have come to naught, to judge by the actual ex post investment activity of the Company in that year (except for the 'maverick' observation of Hoffmann). We are told that in 1930 the operating deficit could only be contained at 180 mill.Rm. by reduction of expenditure on physical assets *28. The sharp and unexpected cutback in railway capital expenditure at the end of 1927 had serious consequences for the private sector *29.

6.3.3 Investment in local railways, tramways etc rose steeply

*27 Wd 14/1(1929) p 451, 'Zur Lage der Reichsbahnfinanzen'; 15/1 (1930) p 801, 'Der Abschluss der Reichsbahn für 1920'; 15/2 (1930) pp 1521ff, 'Das Arbeitsbeschaffungsprogramme'.

*28 See Table 6a p 177. Wi.u.St. 1932 p 411; Wd 16/1 (1931) p , 'Ergebnisse des Reichsbahnjahres'.

*29 See Ch. 8 p 292.

between 1926-28, then fell again. It is probable that this global figure is dominated by the spending of a few major local transport authorities, notably those of Berlin, which embarked on substantial programmes that culminated in 1928/29 - programmes which landed the city in the severe financial difficulties reported above. To ease these difficulties, by facilitating overseas borrowing, the Berlin transport undertakings merged into the Berliner Verkehrs AG in 1929 *30. The protocols of the Advisory Council for Foreign Credits reveal considerable investment by other large local authorities in transport undertakings in 1928, and the illiquidity it caused *31.

6.3.4. The last class of public sector investment in 'communications' to be considered is that of the Post Office. This organisation evidently planned heavy investment in telecommunications throughout the decade *32. The internal financial structure of the Post Office seems to have been healthier than that of the Railway Co.; it generated a net profit after all fixed charges throughout the

*30 See pp126-7 above; also O Büsch, Die Berliner Kommunalwirtschaft ... p 81; BA R2/2130, sitting of Advisory Council on 11.12.29.

*31 Eg of major towns: BA R2/2128, sitting of the Council of 15.3.28 - Munich, Dresden; 16.3.28 - Frankfurt/Main; BA R2/2129, 30.4.28 - Magdeburg; 3.5.28 - Stuttgart; 11.5.28 - Mainz; 12.6.28 - Duisburg; BA R2/2130 - 13.11.28 - Oberrheinische Eisenbahngesellschaft. Transportation takes a decided second place to public utilities; but the fact that it is mentioned at all in support of an application indicates its urgency, since such expenditure was, according to the 'guidelines', very borderline. See p. 106 above.

*32 Cf P Czada op.cit. pp 158, 173-93. It seems that effective orders were rather below those of the inflation years however.

1920s *33. In 1926 it was able to float capital issues to the tune of 300 mill.Rm. with the aid of which it made a substantial contribution to the Work Creation Programme of that time *34.
The reduction of capital expenditure in 1927 (see Table 4a p 173 above) was therefore in part truly counter-cyclical - caused by the conclusion of the Work Creation Programme. But it also expresses a deterioration in the Post Office's internal liquidity because of its inability to float an intended further 150 mill.Rm. bond in that year. The Post Office therefore applied successfully for a considerable increase in charges in July 1927, which increase, as well as the general economic upswing, generated the dramatic recovery of profits in 1927/28. Despite this, the capital expenditure of 1927 was not completed without a deterioration of internal liquidity, which got worse in 1928 when external financing still proved impossible, and the Post Office was burdened by the salary increase and a 50 mill.Rm. increase in its cash transfer to the Reich (to 120 mill.Rm.p.a.).
The level of investment actually achieved involved borrowing from the cash balances of the Postal banking services (Postscheckverkehr) in

*33 Wd 15/2(1930) pp 1521ff, 'Das Arbeitsbeschaffungsprogramm'. The net profit of the Post Office was 185 mill.Rm. in 1925/26 (year ending 31.3.), 125 mill.Rm. in 1926/27 and 253 mill.Rm. in 1927/28. See Wd 12/2(1927) p 1126, 'Die Finanzlage der Reichspost'; 13/2(1928) p 1675, 'Der Abschluss der Reichspost für 1927'.

*34 Wd 12/1(1927) p 157. In February 1926 the Post Office applied to the Advisory Council about a foreign issue of 130 mill.Rm. in view of the impossibility of domestic flotation. Presumably it withdrew its application in view of the subsequent domestic improvement. No further substantial foreign issues seem to have been contemplated: BA R2/2100.

the hope that external financing would release this in 1929 *35. Nevertheless the rather more favourable position of the Post Office is seen in the fact that it alone of the authorities involved could fulfil its obligations under the government's Work Creation Programme of 1929/30. *36. Not till 1931 did the Post Office run into deficit, as a consequence both of declining revenues and of vastly increased cash demands of the Reich (227 mill.Rm. in 1931). But even in that year it could raise 150 mill.Rm. in long term and 20 mill.Rm. in short term loans *37.

To conclude: the Post Office had little greater success in the 1920s in raising external finance than the Railway Co.; its more satisfactory internal generation of funds gave it the freedom to follow a policy that, from a macro-economic point of view *38, had real elements of counter-cyclicality. In the long run, however, (ie after 1929) its finances were subject to the same pressures as those of other public bodies.

*35 Wd 13/2(1928) p 1675, (cited *33); 14/2(1929) p 1817, 'Der Abschluss der Reichspost für 1928'; cf. Stat.Reichsamt, Einzelschrift No. 14, Die deutsche Finanzwirtschaft ... p 61. They were not actually repaid until the capital issues of 1930: K Sautter, 'Der Kapital- und Zinsendienst der deutschen Reichspost', p 321.

*36 Financed out of the 160 mill.Rm. Post Office share in the Young Loan, 120 mill.Rm. Treasury Notes, (Schatzanweisungen) and out of internally generated funds. The increased expenditure, we are told, fell mainly in 1929. This is confirmed in Table 4a p 173 above.

*37 Wi.u.St. 1932 p 678, 'Die Finanzen der deutschen Reichspost'. Most of the loans had to be devoted to the payment of existing debt.

*38 From the standpoint of supplying firms however this tended merely to mean displaced alternation of high and low activity: P Czada op.cit. pp 173-193.

6.4. Investment in Public Utilities

Of total fixed investment in public utilities during the period under review over 80% was undertaken by the public electricity supply *39. Accordingly, the discussion of this section will concentrate on this branch.

Tables 7 and 8 give estimates of the rate of growth of capacity and output, and provide a measure of capacity utilisation in the public electricity supply.

From them we see a virtually uninterrupted growth of output and capacity between 1900 and 1929. This was a new industry and from the demand side the need for net capital formation was continuous *40. Conditions were less favourable from the supply side. Because of its extremely high capital-output ratio the industry was very dependent on external financing. Given contemporary German conditions

*39 G Keiser and B Benning, Kapitalbildung und Investitionen in der deutschen Volkswirtschaft, p 88 (net investment 1924-28); Wi.u.St. 1933 p 412 (gross investment of Aktien-Gesellschaften quoted on stock market, or with share capital exceeding 1 mill.Rm.) Of year-to-year change in gross investment by public utilities, 66% of gross changes in 1928-29, and 88% in 1929-30 were accounted for by the public electricity supply.

*40 How far planned capital formation was impeded 1914-24 is hard to judge. From Table 7 the absolute growth of capacity and output accelerated steadily up to 1929 whereas the relative growth rate decelerated. This is but as one would expect in a 'new industry'. The improved utilisation 1911-24 probably reflects the development of the 'grid' (1920 utilisation clearly reflects the disturbances of that year). Possibly the utilised plant in 1924 was less efficient than desired; hence a rapid concentration of production thereafter. See pp 191ff below.

*41 O von der Gablentz, 'Kapitalstruktur und Kapitalertrag der deutschen Industrie, p 107; E-A III/2 op.cit. p 65; cf. the debt-equity ratios that can be roughly inferred from Hoffmann ... pp 774-5, 778-9.

Table 7a Installed Capacity (000 Kilowatts) and Actual Output (mill. Kilowatt Hours) of the Public Electricity Supply

	Capacity	Output		Capacity	Output
1900	150	246	1925	4400	9915
1911	980	1800	1926	5171	10208
1913	1250	2500	1927	5728	12317
1920	3000	3500	1928	6297	14146
1924	4000	9000	1929	7490	16390
			1930	7960	15910
			1931	8010	

Table 7b Rates of Increase* (%) of Capacity and Output

	1900/11	1911/28	1913/24	1924/28	1925/28
Capacity	147	146	106	44	35
Output	152	155	113	44	35

* absolute increase as % of initial and finishing values.

SOURCES: E-A III/2 Die deutsche Elektrizitätswirtschaft p 8,11. Wi.u.St. 1938 pp 412-3; E Kolling, Die Elektrizitätswerke in Deutschland, p 35.

NB These sources all rely on the statistics of the Reichsverband der öffentlichen Elektrizitätswerke.

Table 8 Average Annual Capacity Utilisation in the Public Electricity Supply

	Utilisation		Utilisation		Utilisation
1900	1640	1924	2250	1928	2246
1911	1840	1925	2253	1929	2187
1913	2000	1926	1974	1930	2023
1920	1166	1927	2150	1931	1799

METHOD OF CALCULATION: In Table 7a divide output by capacity. This was a commonly used contemporary measure. It is only valid in conjunction with information about the relationship between peak utilisation at any point of time and average utilisation over the year. Furthermore it conveys no information about the efficiency of the plant being utilised.

NOTE TO TABLES 7 AND 8: The definition of public electricity supply is rather wider for 1900-24 than for 1925-1931. See E-A III/2 op.cit. pp 8,11.

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this factor might have been expected to inhibit growth, but it should also be noted that the electric power companies enjoyed favoured status on the capital markets at home and abroad, relative to other companies of similar size. This conclusion follows from a consideration of i) the relatively large amounts of debt issued; ii) the high proportion of this debt issued abroad; iii) the relatively low interest rates at which it issued its debt despite i) and ii), and the fact that the bulk of it was floated later in the decade than that of other industries (doubtless because of the long gestation lag *42) - ie when rates were rising again. See Tables 9 and 10 for verification.

So much for the long term growth possibilities and constraints. The increase in the industry's gross investment expenditure was interrupted twice in the Weimar period, temporarily in 1925, and permanently in 1929. Is this related to the peaks in the inflow of new domestic orders to the Siemens Schuckert Werke (major manufacturer of electric power equipment) *43, in mid 1925 (following a plateau of uncertain length), and mid 1928 (following a plateau since late 1927) *44?

*42 It was the practice not to issue long term debt till the projects to be financed were near completion.

*43 See Diagram 8/I p 248 below.

*44 Cf Table 1, col B2 p 168 with Diagram 8/I below.

Table 9a Issue of Fixed Interest (Long Term) Securities by Branch of Industry/Commerce 1.1.24 to 31.12.28/29 Mill.Rm. or %

	At 31.12.28	31.12.29	31.12.29	Ratios Columns	
	1 Foreign	2 Foreign	3 Domestic	2:1	3:2
Coal, Iron, Steel	922	1012	310	110	31
Other Manufacturing[1]	401	438	475	109	108
of which, Elec.Eng.[2]	267	302	40	113	13
Public Utilities	972	1084	96	111	9
of which, P.E.S.[3]	850	963	95	113	10
Banks	204	204	22	100	11
Railway, Tramways[4]	110	112	7	102	6
Shipping Lines	109	127	3	116	2
Trade	107	105	11	98	11
TOTAL All Industry/ Trade	2893	3146	991	109	31

[1] Manufacturing [2] Electrical Engineering [3] Public Electricity Supply [4] excluding the German Railway Co.

Table 9b Average Nominal Rates of Interest at 31.12.29 on Outstanding Long Term Debt Issued since 1.1.25 %

	Domestic	Foreign
Coal, Iron, Steel	7.0	6.8
Other Manufacturing	7.3	6.7
Public Utilities	6.6	6.5
Transport*	7.3	6.5
Trade	7.2	6.5
Banks	6.0	6.0

* ie Railways and Tramways (excl. German Railway Co.) and Shipping.

SOURCE to Table 9a; Wi.u.St. 1930 p 386.
Table 9b: calculated from above source. Debt on which interest rates were variable was ignored. For simplicity the rate appropriate to each class was assumed to be the highest. This assumption will not affect the internal rank order of the above average rates, but biasses each of them c.½% upward.

The Siemens Schuckert Werke (SSW) would also supply equipment for electricity generation outwith the public electricity supply. While however in 1926 only 55% of total electricity output was generated by the public supply, c.73% of the increase installed capacity between 1926-28 was undertaken by the public supply *45.

If the public electricity supply did dominate the SSW index *46, then we discover a lag between the turning point of new orders and that of the activation of new assets in balance sheets of one to two years. A lag of this length was noted by contemporaries *47.

The downturn of domestic new orders in 1925 appears to coincide almost exactly with the 'Stinnes crisis' of July. Thus Czada appears to be correct in attributing it to increased difficulties of foreign borrowing and increased tightness of the domestic financial markets *48.

*45 Inferred from the Tables in E-A III/2 op.cit. pp 8,14. Cf. relative output developments 1925-29: E Kolling op.cit. p 35.

*46 Of course, had the industrial demand for generating plant for private use been more variable than that of the public electricity supply, then private demand may have dominated the turning points. The fact that the SSW index lags the turning point in the mechanical engineering industry's domestic new orders index (below pp 247-8) may confirm that this former index is dominated by the orders of the public electricity supply, since firms buying generating plant for private use would also dominate the latter index. But against this I note that the separate new domestic orders index of heavy industry for the products of the mech. engineering industry conforms more to the SSW index than it does to the general mech.engineering domestic index; and this branch was a very important purchaser of generators for private use.
At any rate, it is unlikely that the turning point in orders of the public electricity supply deviated much from that shown by the SSW index, or it would not have shown that pattern.

*47 E Kolling op.cit. p 35. Cf. the methodological note on Public Utilities to Table 1 p 169 above.

*48 P Czada op.cit. p 179. This timing does however suggest that a fall in orders for heavy industry may have been important.

But the conditions in foreign markets improved rapidly in the autumn of 1925; yet new orders remained depressed till the summer of 1926 *48A. It seems therefore relevant also to point to the substantial fall in capacity utilisation between 1925 and 1926, indicated in Table 8 p 185 . In the later 1920s over 80% of the public electricity supply was sold to industry *49, and the available indexes suggest that industrial production, and the production of electricity were falling after the spring of 1925 *50.

The knowledge of the length of the gestation lag would presumably cause firms in the public electricity supply to reduce their investment promptly. The recovery of new orders in mid 1926 would then be associated with cognizance of the recovery of industrial production from the spring of that year.

Czada does not advance a specific explanation for the decline of new orders in mid 1928 *51. But in this case borrowing problems were more prolonged. The closure of foreign capital markets from December 1926 to June 1927, followed by their overloading for the following twelve months, then finally signs of renewed deterioration of the US bond market from c.June 1928, can be expected to have had a cumulative effect on expectations. The depression of the domestic bond market after February 1927 was less important to the industry, but would act in the same direction. Nor is it irrelevant that the level of short

*48A Cf. the new foreign bond issues in 1925: Wk 5(1926) p 41. In fact the public electricity supply borrowed quite heavily abroad: Wk 4(1925) p 450, 5(1926) p 43.

*49 E-A III/2 op.cit. p 3.

*50 Konj.Stat.Hdb. pp 52-3; for monthly electricity production (sample of 122 works) see Konj.Stat.Hdb.(1936) p 57.

*51 P Czada op.cit. p 191.

term indebtedness in the industry was the subject of increasing concern, especially from early 1928 *52. The prolonged plateau of new domestic orders to the SSW may also reflect these problems. True though it is that no other branch of the economy succeeded in issuing so much long term debt abroad in later 1928 and 1929 (see Table 9a p 187), nevertheless the largest firm in the industry, the Rheinisch-Westfälische Elektrizitätswerke, could only float a New York bond in late 1928 by according it conversion rights to equity *53. Apart from borrowing problems, one might suppose that publicly-owned electric power companies were under increasing pressure by reason of the growing sums they were expected to transfer to their governmental owners. Evidence of deteriorating communal finances from the beginning of 1928 suggests that by mid 1928 this may have been a significant factor *54.

Is there any relationship in 1928 between the development of capacity utilisation, and the rate of investment in the industry? Capacity utilisation reached a peak in 1928, but the decline in 1929 was very mild (see Table 8 p 185). The growth of the output of electricity did not slacken in 1928-29, by contrast with 1925-26 (cf. Table 7 p185),

*52 In 1928/29 an analysis of 80 leading Aktien-Gesellschaften in the industry revealed that over half of their debt was short term: E-A III/2 op.cit. pp 66ff. The Commission concluded that the problem of unconsolidated debt became acute from mid 1928. But it is clear from the protocols of the Advisory Council for Foreign Credits that for many works owned by the public sector, it was acute at least from late 1927 (BA R2/2128, 2129. See pp 115ffabove).

*53 DV 12.10.28 p 36. Cf. the discussion p40.

*54 See Tables 10-11p 117-7. Also E-A III/2 op.cit. pp 59, 79. The report indicates that for this purpose prices were often increased; if short run demand elasticity were low, then the effect of this on net retained earnings may have been positive.

just in the same way as industrial output as a whole only stagnated, but did not decline in the later period *55. It is possible however that capacity utilisation is related to the reduction in investment intentions in another way. In 1928 average annual capacity utilisation was no higher (2250 hours) than in 1924-25. Assuming that i) the relationship between peak and average annual utilisation did not alter over these years, and ii) that improvements in the functioning of the 'grid' had increased the efficiency with which peaks in different parts of the country could offset each other *56, this would appear to imply that even in 1928 utilisation was lower than desirable *57.

It may be however that much of this capacity was obsolete, so that annual average capacity utilisation does not adequately measure the relationship between the actual and the desired stock. Certainly the investment activity of 1924-29 involved substantial technical progress.

*55 Cf. references cited *50.

*56 It seems likely that considerable progress was made in the unification of the 'grid' during those years, at least within large regions, despite the delays caused by local monopolies, and the disagreements between the Reich/Prussian sponsored A.G. für Elektrizitätswirtschaft, and private or mixed companies like the Rehinisch-Westfälische Elektrizitätswerke. On these questions see H Büggeln, Die Entwicklung der Elektrizitätswirtschaft in Deutschland ... pp 137ff; T P Hughes, 'Technology as a Force for Change in History', pp 153ff; E-A III/2 op.cit. pp 33ff. The current comment can be followed through the pages of DV: 4.11.27, p 135; 18.5.28, p 1107; 27.7.28, p 1466; 12.10.28, pp 36-7; 15.2.29, p 617; and esp. 22.2.29 p 655; and 10.5.29 p 1059. See too 13.1.28 p 449.

*57 According to E-A III/2 op.cit. pp 24-8 the development of the 'grid' between 1913-28 permitted an increase of 33% in average annual capacity utilisation. The observed increase in Table 8 p 185 is only 13% however. This consideration seems to reinforce the argument of the text.

At the frontier of technology, the most advanced works in 1928/29 used c.⅓ less coal per unit of electricity produced than in 1924/25 (c.50% less than in 1913) *58, and there was very rapid concentration of capacity in larger plant. See Table 10.

Table 10 Distribution of Generating Capacity by Size of Plant Public Electricity Supply

Size of Plant (Kw)	% of Total Capacity		Number of Plants	
	1926	1928	1926	1928
1 - 1000	4.4	3.6	1079	1060
1001 - 10000	13.1	11.2	205	218
10001 - 100000	68.2	63.7	120	132
Above 100001	14.3	21.5	4	7

SOURCE: E-A III/2 Die deutsche Elektrizitätswirtschaft p 14.

Nevertheless it is unlikely that the degree of obsoleteness of the extant capital stock was greater in 1928 than it had been in 1925; and if it was argued that considerations of capacity utilisation must enter the explanation of the reduction of new orders in 1925, it would be inconsistent to exclude them from the explanation of the reduction in 1928, though probably playing a role subsidiary to that of financial factors.

The industry's financial difficulties intensified after mid 1928. By the end of 1929 in many cases creditors would countenance no further deterioration in the debt:equity ratio. In order to raise capital a number of public enterprises in the industry had to seek private

*58 Ibid. p 12.

shareholders *59. Do such difficulties explain why gross investment in public utilities fell by two-thirds in Germany between 1929-33, whereas in the UK they increased *60 ?

6.5. Housebuilding

As in the case of railways, annual average net investment in housing in the quinquennium 1925-29 was considerably less (in 1913 prices) than the decadal average for 1904 - 13 *61. Whereas there may be some question as to the strength of the underlying demand in the case of railways, basic physical demand for housing was very great, because of low rates of construction in the decade 1914-24 *62. See Table 15. A Reich housing census (Reichswohnungszählung) conducted in May 1927 fully confirmed the prior impressions of serious shortage. For

*59 Ibid. pp 81ff. Also O Büsch op.cit. pp 163-4, 169-70.

*60 St.Jb.f.d.dt.R. 1938 p 565, and C H Feinstein, National Expenditure ... p T92.

*61 See Hoffmann ... p 258, assuming the comparability of his rather shaky (residual) series for before 1914 with his post 1924 estimates. Lest Table 1' p194 appear to contradict this assertion, I note that housebuilding appears to have been less in 1913 than in any year since 1900.

*62 A Table in Zement 1926 p 216, showing net increases in housing per head of population in cities, clearly shows that the rate in 1920-24 was generally one-fifth to one-half of that in 1909/13 (ultimate source: Stat.Reichsamt).

Table 11 Housebuilding in Germany 1913-30 Thousand Dwellings

1 Net Increase* in Dwellings (Net of Demolitions)				2 Gross Increase* in Dwellings (Gross of Demolitions)			
1913	200	1922	147				
1914	114	1923	118				
1915	52	1924	107	1924	115	1931	252
1916	15	1925	179	1925	192	1932	159
1917	6	1926	206	1926	221	1933	202
1918	3	1927	289	1927	307	1934	319
1919	57	1928	310	1928	330		
1920	103	1929	318	1929	339		
1921	134	1930	311	1930	330		

SOURCE: W Fey, Leistungen und Aufgaben im deutschen Wohnungs- und Siedlungsbau, pp 10,13; cf. Konj.Stat.Hdb.(1936) p 246.

* New dwellings and conversions. Each of the latter is estimated at $\frac{1}{3}$ of a new dwelling. Cf. G Keiser and B Benning op.cit. p 201.

example, c.10% of families lacked their own dwelling *63.

But physical shortage is not identical to market demand, as contemporaries remarked *64. And in fact it was generally believed that

*63 The census is reported in Statistik des deutschen Reiches Vol. 362. A summary appears in Wi.u.St. 1928 pp 82-5. For general comment see Zement 1929 pp 206-7, 'Lehren aus der Reichswohnungszählung'; DV 2.3.28 pp 690-691; BBZ 23.1.27, 'Das deutsche Wohnungsproblem'; E-A III, Der deutsche Wohnungsbau, p 4; Wk 8(1929) p 379, 'Materialien zur deutschen Wohnungswirtschaft'. Overcrowding was however perhaps less intense in cities than in 1910: Wi.u.St. 1929 p 245, 'Der Wohndichte ...' But expectations had risen: Zement 1928 p 169, 'Ein Wohnungsbauprogramm der Gewerkschaften'.

*64 E-A III, Der deutsche Wohnungsbau pp 4-5; Zement 1928 pp 206-7. Indeed, given that controlled rents were well below free market rents that operated on new dwellings, (see below ?), . . overcrowding is a rational response to the housing policy. As a result of the rent control, prices of pre-1924 houses remained well below pre-war levels: Wk 4(1925) p 164, 6(1927) pp 413ff.

building costs had risen so steeply relative to other prices that a free market determination of dwelling prices, hence rents, would have choked demand for new housebuilding back to a fraction of the level actually achieved. This was for two reasons.

Firstly it was thought that costs of building materials and labour had risen since 1913 more than prices in general *65. But a more important reason was the much higher level of interest after 1924 *66. Had the rents on new dwellings been entirely determined by 'free market' forces, then, according to a memo published by the Reich Labour Ministry, they would have been three times their 1913 level and twice the levels actually obtaining in the later 1920s *67. The inequity of such a level of rents would have been aggravated by the fact that the inflation had eradicated most of the debt burden of owners of pre-stabilisation property. This was true even after the re-evaluation of mortgages at c.25% in 1925 *68.

*65 The revised index of building costs reached 170 in 1928 (1913 = 100): Wi.u.St. 1933 p 424. Industrial producer goods by contrast reached 137, consumer goods 174: Konj.Stat.Hdb. (1936) pp 104, 106. The general consideration that building was a labour-intensive industry, with a low input of foreign raw materials may help to explain its relatively high costs. For a detailed discussion see E-A III Der deutsche Wohnungsbau pp 20ff, 595ff.

*66 German dwellings were seldom owner-occupied; hence could often attract long mortgages: F Lütge, Die Wohnungswirtschaft, p 341. It was estimated that a mortgage rate reduction from 8% to 7% would have reduced rents on a 10,000 Rm. house by 100 Rm p.a. To achieve such a reduction by building economies would require a saving of 1200 Rm. in construction: E-A III, Der deutsche Wohnungsbau, p 9.

*67 As reported in Zement 1928 p 121, 'Wohnungsbau und Bauwirtschaft'. Confirmatory calculations appear in Wk 8(1929) pp 384-5 (article cited in *63).

*68 See p 123 above and references thereto.

In fact a free market in housing had not existed since 1917 when rent control was instituted, codified in the Reich Rent Law (Reichmietsgesetz) of 24.3.22 *69. In 1924 a new tax (Gebäudentschuldungssteuer; in Prussia, Hauszinssteuer) was instituted, whose purpose was to expropriate part of the windfall gains to owners of pre-1924 property *70. Rent control was retained on this property, but not on dwellings built thereafter *71. Instead, large amounts of public money were channelled toward housebuilding.

Before 1913 the pattern of housing finance was as follows. The construction of the house was financed by 'interim credits' (Zwischenkredite) coupled with the capital of the prospective owner ('der Bauherr'). On completion, this financing was usually consolidated by the incurring of two mortgages: a 'first' (erststellige) mortgage (at a rate of c.4%) which usually covered 60% of the price, and a 'second' (zweitstellige) at c.5% which added another 15-25%. The remainder was met by the owner's own capital. Even before 1913 the procuring of all but the first mortgage had been an uncertain business. After 1924 it seldom proved possible to obtain first mortgages

*69 Zement 1926 p 855ff, 'Wohnungspolitik und Bauwirtschaft'; F Lütge op.cit. pp 397ff.

*70 F Lütge op.cit. pp 352ff; W Fey, Leistungen und Aufgaben im deutschen Wohnungs- und Siedlungsbau, pp 12ff; E-A III Der deutsche Wohnungsbau pp 10ff. The tax was levied by the states, and part of it transferred to the communes: Stat. Reichsamt, Einzelschr ... No. 14 op.cit. p 54. The rate of tax was between ⅓ - ½ of 1913 rents. See the comprehensive table in Zement 1928 p 1027.

*71 For an index of controlled rents on pre-1924 dwellings, see W Fey op.cit. p 1[illegible]. Uncontrolled rents on new dwellings were twice as high as on controlled stock: see Zement article cited *67, p 122.

covering more than 40% of the price (and that at 8% - 10% interest); second mortgages were practically unobtainable from private sources. The Reich therefore stipulated that a proportion of the revenue from the Gebäudeentschuldungssteuer be devoted to the financing of housebuilding - usually to the provision of moderately priced second mortgages, or, less often, of 'additional' first mortgages (Zusatzhypotheken), or mortgages guarantees, or interest subsidies *72. This was not the limit of public assistance for housebuilding. Other methods included *73:

i) Housebuilding directly undertaken by the public sector (chiefly by communes, by the Reich/Prussia in connection with east German resettlement schemes, and by public enterprise employers). Between 1927-29 c.10% of new dwellings was constructed by public authorities. A related 'aid' to housebuilding was the cheap mortgages available to government employees *74.

ii) Aid to 'non-profit-making' building trusts (gemeinnützige Wohnungsbauvereinigungen), chief among which were building cooperatives (Baugenossenschaften). These bodies became highly dependent on public subsidies, interest subsidies, guarantees, and

*72 F Lütge op.cit. pp 340-352; Zement 1928 p 167, 'Wohnungsbau und Bauwirtschaft'; in practice c.50% of Hauszinssteuer revenue was devoted to the financing of housebuilding 1924-30: W Fey op.cit. p 59.

*73 For state intervention in housebuilding see in general: A Stegerwald, 'Der deutsche Baukapitalbedarf ...' pp 148ff; Karl Hochdörffer, Die staatliche Subventionen, pp 34-57, 92-8.

*74 F Lütge op.cit. pp 231, 286-291, 352; 'Direct' housebuilding was considerably greater in the inflation, according to Lütge loc.cit. For loans to civil servants, see A Stegerwald op.cit. pp 164-5, Tables 1a, 1b.

participation in their capital, in the financially difficult times after 1924. They built between 25% and 35% of all dwellings 1927-29 *75.

iii) Interim finance. Most notable in this respect was the 200 mill.Rm. credit extended by the Reich 1926-27 in connection with the Work Creation Programme *76. More permanent was the work of the Deutsche Bau- und Boden Bank AG set up in 1923. Its capital was supplied by the Reich, but its finance was raised in the domestic, and to a lesser extent, the foreign capital markets *77.

Table 13 presents estimates of the financing of housebuilding. These show that c.40% to 60% was provided by public authorities. In 1927-29 about 80% of houses was constructed with some aid from public moneys *78. It is plain therefore that from the supply side housebuilding was as significantly determined by the availability of public as of private finance. Hence its inclusion in this chapter.

*75 F Lütge op.cit. pp 231, 270ff.

*76 F Lütge op.cit. p 340; Wd 11/2(1926) p 1374, 'Arbeitsbeschaffung'; Zement 1927 p 175; A Stegerwald op.cit. p 153; IHZ 1.3.27, 'Die Beschaffung der Zwischenkredite für den Wohnungsbau'.

*77 F Lütge op.cit. pp 340, 352. See the reports of the Bank in Zement 1928 p 418, 1929 pp 313-4; IHZ article cit. *76. A Stegerwald op.cit. p 169. In 1929 its outstanding credits were valued at 450 mill.Rm. More institutional, but doubtless a potent form of state aid may be discerned in the fact that c.80% of all finance for housebuilding was mediated through public sector financial institutions: E Kleiner, 'Die Ausbreitung der öffentlichen Unternehmung in der deutschen Bankwirtschaft', p 419.

*78 F Lütge op.cit. pp 354-5.

Table 12 Urban Quarterly Housebuilding Statistics (Thousands of Residential Buildings or Dwellings*)

KEY: Permits = Applications for permission to commence building.
Net Additions = Completions of Buildings/Dwellings net of Demolitions.

IQ26; IIQ26 etc = 1st quarter of 1926, second quarter of 1926 etc.

A No. of Cities in Sample = 86 Residential Buildings

	Permits	Net Additions		Permits	Net Additions
IQ25	4.1	3.2	IQ26	3.5	4.6
IIQ25	5.7	3.4	IIQ26	6.0	4.4
IIIQ25	4.8	3.6	IIIQ26	6.4	4.8
IVQ25	4.6	5.7	IVQ26	6.0	7.2

B

	Permits		Net Additions	
	Buildings	Dwellings	Buildings	Dwellings
No. of Cities	90/91	83/85	92/93	92/93
IQ26	3.6	9.0	4.6	15.2
IIQ26	6.2	15.9	4.4	16.2
IIIQ26	6.6	16.7	4.8	17.7
IVQ26	6.2	16.7	7.3	26.3
IQ27	6.7	22.4	5.5	20.6
IIQ27	9.3	33.8	5.4	21.4
IIIQ27	8.6	32.1	6.6	25.2
IVQ27	6.3	23.8	9.6	38.0
IQ28	5.7	20.0	6.6	27.9
IIQ28	7.7	27.1	6.2	25.5
IIIQ28	8.8	34.8	7.7	28.3
IVQ28	7.5	32.9	9.6	39.4

C No. of Cities in Sample: 95/96

IQ28	5.8	21.9	6.7	28.0
IIQ28	7.8	30.0	6.3	25.7
IIIQ28	9.1	39.2	7.8	29.4
IVQ28	7.6	35.0	9.7	39.8
IQ29	6.0	25.9	4.9	20.8
IIQ29	10.7	47.0	4.8	22.4
IIIQ29	11.4	53.8	8.0	36.6
IVQ29	7.2	32.7	13.0	57.3

* Residential Buildings = Buildings containing one or more dwellings.

D Permits for Residential Buildings* Deseasonalised
(Thousand Buildings)

	1925	1926	1927	1928	1929
IQ	5.4	4.7	8.8	7.5	7.9
IIQ	5.0	5.3	8.1	6.7	9.3
IIIQ	4.2	5.5	7.3	7.7	9.8
IVQ	5.0	6.6	6.9	8.1	7.7

* ie buildings containing one or more dwelling.

SOURCES: Table 12A: Wi.u.St. 1926 p 363; 1927 p 228.
12B & C: Wi.u.St. 1929 p 86, 1930 p 129.
12D: The described series (irrespective of sample variations) was deseasonalised on the basis of the average relationship between quarterly permit issue for the entire period 1925-29.

Table 13 The Financing of Investment in Housebuilding
Current Prices Mill.Rm.

	1925	1926	1927	1928	1929	1930
1 Gross Investment	1700	1900	2600	2800	2900	2400
Financing*						
2 From Public Sector*	935	1110	1340	1340	1230	1010
3 Of which 'Hauszinssteuer' m'gages	540	670	780	775	765	695
4 From Banking Sector*	765	790	1260	1460	1670	1390
Of Which						
5 Mortgage Banks	100	225	365	670	555	620
6 Insurance**	25	45	75	80	100	120
7 Savings Banks	130	250	450	455	455	325
8 Social Insurance	35	40	55	170	130	170
9 Other	475	230	315	135	430	155

* excluding interim finance
** excluding Social Insurance (shown in column 9)

SOURCE: W Fey, Leistungen und Aufgaben ... p 14.

Ultimate Sources to Table 13: Line 1: Stat.Reichsamt; cf Table 1b col. 4 p 168 above. Lines 2 and 3: Made up of Hauszinssteuer mortgages and other public funds. The former (covering all states of the Reich) were directly obtained from government accounts; so also other applications of the revenue of this tax to housebuilding. For the other forms of state aid, (excl. interim financing) estimates for cities were extrapolated. Lines 5-8: These are based on estimates of the stock of housing mortgages owed to each class of institution listed, checked against estimates of increases of total urban mortgages, with certain adjustments. These various data enable an estimate of the proportion of the total mortgage increase which was lent on new houses; it was assumed that for all classes of institution this proportion rose slowly from 1924. Line 9: This is a residual, and includes the owner's own capital, privately arranged mortgages, interim financing outstanding at the end of the year, payment delays, errors due to delay in recording mortgages, other errors and omissions (including those in line 1).

Having described the general structure of the housing market in the period, I turn to its short run cyclical aspects. It will be noted that in Table 1A col. 3 (p 168) housebuilding, according to Hoffmann's estimates, reached a peak (in current prices) in 1927, whereas according to the Stat.Reichsamt estimates in Table 1B col.3 (p 168) it reached a plateau in 1928-29. Both these may be compared with the Stat.Reichsamt estimates of numbers of houses completed annually (Table 11 p194). Setting 1928 = 100 for ease of comparison we find:

Table 14 Annual Housebuilding Estimates 1928 = 100

	1925	1926	1927	1928	1929	1930
1a Number of completed houses	55	67	93	100	102	100
1b Housebuilding	59	67	93	100	103	-
2 Stat.Reichsamt	61	69	93	100	102	86
3 Hoffmann	65	81	96	100	93	62

SOURCES: Line 1a: Table 11 p 194 above.
Line 1b: See text following and footnotes.
Line 2 & 3: Table 1A col.3, 1B col.3 p 168 .

The relationship in this Table between numbers of completed houses (line 1a) and the Stat.Reichsamt estimates of gross investment (line 2) can be demonstrated quite easily. The difference arises out of a) change in housebuilding costs, and b) adjustment for the work done on houses still incomplete at the year-end. Data are available for both calculations *79. In line 1b I show a rather crude adjustment of 1a to allow for both sources of difference. Since Hoffmann uses data and methods different in principle from the foregoing *80, I cannot account for the eccentricity of his estimates, especially the 7% drop between 1928 and 1929. It seems likely that the annual rate of housebuilding maintained a plateau during 1928-29

*79 For a) 1924-28 see Keiser and Benning op.cit. pp 148ff, 200-1. These data adjust an index of building costs for change in average size and appointment of dwellings. I assume that costs per dwelling were constant 1928-29. Building costs still rose, though more slowly (Wi.u.St. 1933 p 424). But the number of dwellings per building was rising, which presumably offset the rise in costs: W Fey op.cit. p 16.
For b) see W Fey op.cit. p 13, incorporating incomplete houses at year-end by the method of Keiser and Benning loc.cit.

*80 ie Stat.Reichsamt data published before 1938. See Hoffmann ... pp 228ff. As can be inferred from Table 11 p 194 the rate of demolition cannot explain the discrepancy.

in current prices, perhaps falling a little in constant prices *81. The steady increase of the annual rate of housebuilding from 1924 to 1928-29, in contrast to the variability of industrial/commercial fixed investment, conforms to the pre-war pattern *81. Nevertheless, the advance was not unimpeded. Demand was strong, as measured by the low percentage of empty dwellings, right up to 1930, when , doubtless as a result of the general depression, landlords first began to experience letting difficulties. Nor is there any evidence that firms were unable to cope because of lack of materials or labour, in 1929, even though the severity of the winter 1928/29 compelled a greater than usual concentration of activity in the summer and autumn *84.

*81 i) Contemporary opinions are usually based on available Stat. Reichsamt data, so seldom constitute independent evidence. In FZ 6.1.30, 'Das deutsche Baujahr 1929' it was opined that housebuilding was 12% less than in 1928; in FZ 12.3.30, 'Der Wohnungsbau 1929 und 1930' this opinion was revised to indicate no change (money value) or increase (no. of dwellings).
ii) F Lütge op.cit. pp 354-5 indicates a fall in housebuilding investment 1928-29, but his data patently rely on Stat.Reichsamt estimates of an earlier vintage than that reproduced here (or by Hoffmann). The same data is shown in A Stegerwald op.cit. p 165. But reference to Stegerwald shows that Lütge registers the decline in 1929 by ignoring all estimates of interim financing outstanding at the end of the year. In other respects Lütge's data do not agree well with those of Hoffmann.
iii) The fact that according to Table 12 p 199 above, urban completions in 1929 were c.12% higher than in 1928 may be reconciled with Table 15 by the observation that rural housebuilding in 1929 was much less buoyant that urban. See *97 below.

*82 See the relevant Tables in Hoffmann ... pp 257ff.

*84 According to a table in Zement 1929 p 1427 (ultimate source: IfK) peak employment of building workers during summer 1929 (as % of membership of relevant trade unions) was less than in 1928; cf. St.Jb.f.d.dt.R. 1929 p 279; 1930 p 321. The recession in industrial/commercial building doubtless explains this.

What about the supply of finance? The increase in financing from public authorities appears to have levelled off, ex post in 1928-29 (see Table 13 p 200). Doubtless this is related to the contemporary plateau in public expenditure as a whole, having its origins in the already described difficulties of the public finances. It is true that in 1928 greater care than heretofore was taken to ensure that second mortgages and interim finance would be provided from public funds only when first mortgages were assured, and also that the 200 mill.Rm. credit for interim financing, made available by the Reich during 1926-27, was replaced by guarantees of privately obtained finance; and yet the reports on housebuilding in 1928-29 do not cite public authority financing as the problem *85. Not until the 'economy measures' (Sparaktion) of the German cities in late autumn 1929 were public expenditure cuts expected to affect the rate of housebuilding *86. The remarks of this paragraph would also apply to the financing afforded by Savings Banks *87.

*85 Eg IHZ 1.3.29, p 2, 'Die Finanzierung des Wohnungsbaues 1928' (Report of Deutsche Bau- und Bodenbank); Zement 1929 p 23, 'An der Schwelle des Baujahres 1929'; p 362, 'Die Bautätigkeit im Jahre 1928'; p 358, 'Wohnungsmarkt und Finanzierung ...' (Report of Preuss.Landespfandbriefanstalt); also pp 589-90, 765, 1146; 1930, p 253, 'Die Bautätigkeit im Jahre 1929'; p 204, 'Die Schwierigkeiten der Baufinanzierung im Jahre 1929' (Report of Preuss.Landespfandbriefanstalt); FZ articles cit. *81; C Ziegler, 'Die Wirtschaftslage des rheinisch-westfälischen Baugewerbes im Jahre 1927'; ibid. for 1928 and 1929.

*86 Zement 1930 p 341, 'Konjunkturforschung des Baumarktes'; 1929 p 1501, 'Die Baustoffindustrien zur Einschränkung der kommunalen Bautätigkeit'; Vjh.Konj.forsch. 1929 H3B p 28; C Ziegler, 1929 (article cit. *85). Even in autumn 1929 current financing problems were ascribed above all to the deteriorating position of the private sector institutions: Zement 1929 p 1268, 'Die Schwierigkeiten der Wohnungsbaufinanzierung'.

*87 As the finances of the communes deteriorated they increasingly turned to the savings banks (which they commonly owned) for credit. See Zement 1929 p 1501, 'Die Baustoffindustrien ...'

To judge from contemporary comment, it was variations in the availability of private mortgages that dominated the housebuilding financial market in the short run. This in turn depended on the state of the domestic market for mortgage and related bonds *88. It never proved possible to attract significant foreign capital to this use *89. The major institutions in the market were the private, the 'public status' and the communal mortgage banks *90. Good short run statistics on the net sales of mortgage and related bonds are not available. But from the annual data, the development of their prices (see Tables 2a, 3b, and pp 21, 22 above) and contemporary comment, it is evident that the sale of mortgage bonds was buoyant in 1926 until the general faltering of the domestic bond market in early 1927. Its absorbtive capacity

*88 A comparison of the rate of return on mortgage bonds (Table p62) with the interest rates charged on first mortgages (W Fey op.cit. p 12) shows that the two moved in very close parallel; the latter 1½-2% above the former.

*89 The need for foreign capital was urgently discussed especially after the relapse of the domestic bond market in February 1927, but sums raised were small, and fairly constant 1928-29. According to the Stat.Reichsamt survey of 31.3.28, c.100 mill.Rm. of outstanding foreign credits were for housebuilding (proximate source: Bericht des Kommissars bei der Reichsbank 1.7.29, p40). In 1928 the Reichstag approved a maximum foreign housebuilding credit of 100 mill.Rm. (Zement 1928 p 610, 'Die neuen 100 mill. Auslandskredite'; p 1062, 'Die Quotenverteilung ...'). In 1929 practically no foreign placement was achieved (C Ziegler, 1929, article cit. *85). See too BA R43 I/656 (re activities of the Advisory Council for Foreign Credits); IHZ 5.4.28 p 1, 'Die Auslandsemissionen für den Wohnungsbau'; also 19.6.28, p 1; Zement 1928 p 36, 'Der Baumarkt im Jahre 1927'; p 1195.

*90 Ie Hypotheken-Aktienbanken, öffentlich-rechtliche Pfandbriefanstalten, and städtische Hypothekenbanken, respectively. Cf H Oesterlink, 'Die Kapitalbeschaffung ... des deutschen Immobiliarkredits', or W Prion, 'Organisation des deutschen Kapitalmarktes', both in B Harms (ed) Kapital ... vol. 1, pp 329ff, 400ff.

remained limited till the end of 1927; and this had significant consequences for housebuilding finance, and was believed to have affected the actual rate of housebuilding *91. The deseasonalised building permits series (Table 12D p 200), imperfect though it certainly is, may reflect this. The jump in the value of 'other' financing in 1927 (Table 13 line 9) may reflect the increased amount of unconsolidated interim finance at the end of year *92. In 1928 early forecasts about the problem of housing finance were gloomy, but in the event it proved less problematic than expected, and at the end of the year there was no repetition of the mass of unconsolidated credit with which it had begun *93.

In early 1929 financing prospects were thought favourable. But from the second quarter of the year sales of mortgage bonds fell heavily *94. Yet the actual rate of housebuilding was no less than in 1928. The result was a heavy burden of unconsolidated interim finance at the end

*91 Confirmation is found in the rough index (subsequently discontinued) of gross monthly sales of mortgage bonds: Wk 6(1927) p 454 and 7(1928) p 102, 'Pfandbriefzulassungen'. See too Zement 1928 p 36, 'Baumarkt und Baustoffindustrien'; p 1061, 'Der Wohnungsbau als Zinsproblem'; Vjh.Konj.forsch. 1927 H3 pp 53-4; IHZ 21.5.27, p 4, 'Industriebauten und Wohnungsbauten'; 9.7.27, p 4, 'Stillstand am Immobiliarkreditmarkt'; C Ziegler, 1927 (article cit. *85), p 164ff.

*92 A Stegerwald op.cit. p 166 supports this inference in his Table 1b, as do the articles cited in *91.

*93 See the article in IHZ and those in Zement 1928 and 1929 cited in *85. Further Vjh.Konj.forsch. 1927 H4 p 64; 1928 H2B p 29; H3B p 24ff; C Ziegler, 1928 (article cited *85), pp 186ff.

*94 Zement 1929 pp 589-90, 'Der Bausaison 1929'; 1930 p 253, 'Die Bautätigkeit im Jahre 1929'; Vjh.Konj.forsch. 1929 H1B p 27. Cf net sales of mortgage bonds and the like 1925-29 in Wd 15/1 (1930) p 491; gross sales: Wk 8(1929) pp 321, 432; 9(1930) p 104.

of the year *95.

The fact that applications for housebuilding permits remained high till the end of 1929, at least in cities *96, may indicate short-run insensitivity to financing problems. The resultant build-up of 'frozen in' interim financing added to the liquidity problems of the economy both at the end of 1927 and of 1929, especially of the communes and savings banks which were so prominent in housebuilding finance. But this insensitivity was short run only. It is likely that already in 1929 housebuilding was declining in the countryside *97 where the degree of private sector mortgage finance was probably much higher *98. From 1930, when public funds dried up, housebuilding fell in the cities also.

This lag of about one year between the peak of general investment activity and housebuilding seems, contrary to the analysis of the

*95 Table 13 p 200 (line 9 and notes thereto). Cf A Stegerwald op.cit. p 166 Table 1b. Further C Ziegler, 1929 (article cit. *85) pp 182ff; Zement 1929 p 1268, 'Die Schwierigkeiten ...'; 1930 p 206ff, 'Die Schwierigkeiten ...'; Vjh.Konj.forsch. 1929 H3B p 28.

*96 Cf Table 12 p 199 . Zement 1930 pp 253ff, 'Die Bautätigkeit ...' (where prior securing of mortgage finance is offered in explanation. This seems inadequate).

*97 Zement 1930 p 341, 'Konjunkturforschung ...'; p 206 (cit. *95).

*98 According to a table in Zement 1930 p 622 (ultimate source: Stat.Reichsamt), in cities of above 100,000 population, 40% of prospective owners (Bauherren) of houses under construction were private, 60% were public or cooperative. For communes of 5-10,000 the proportions were reversed. For communes of less than 2000 private owners accounted for 84%. In general, public sector finance went more readily to public/cooperative owners. See above p 197 .
In Zement 1930 p 206 (cit. *95), slackening final demand for dwellings (urban drift) is also offered as a reason.

Institut für Konjunkturforschung school *99, to have been characteristic of the pre-war economy also.

6.6 Conclusion

In each of the types of investment activity considered in this chapter, with the possible exception of that of the Post Office, the problems connected with the raising of external finance (in this context, especially the floating of bonds) have dominated the discussion. In the case of the public electricity supply, and to a small extent housebuilding, the degree of utilisation of the extant stock may also have had some bearing on the reduction of investment activity observed after 1929. But the major common constraint was finance.

And yet in each of these sectors, apart from the German Railway Co., observed gross fixed investment did not decline until some time in 1929 *100. And even in the case of the public electricity supply where a long gestation lag obtained, a decided downturn in investment intentions did not occur till mid 1928. Thus the financial problems of these classes of investment cannot explain the turning point of the cycle, though they undoubtedly reveal much about the basic structure of the economy which made the recession, once under weigh, such a severe one.

* 99 The IfK analysis discerned an inverse relationship before the war between housebuilding and general investment; replaced after the war by a direct relationship. Thus they explained the greater violence of the post war cycle. From Hoffmann's data (pp 257-260) the contrast they draw seems exaggerated. But see *61 above. W Fey op.cit. pp 7-14; Vjh.Konj.forsch. H1 pp 8-9, adopted by Zement 1930 p 341, 'Konjunkturforschung ...'

*100 Ignoring Hoffmann's 'eccentric' housebuilding series. (See p 202 above).

CHAPTER 7 INVENTORY INVESTMENT IN INDUSTRY AND TRADE

7.1. Introduction

Inventory investment is the most volatile component of aggregate investment, and never more so than in the period under review. But the investigation of this vital determinant of short run macro-economic fluctuations has its perils:

> "By the nature of the basic data it is virtually impossible to obtain estimates of a high degree of reliability in this field, and estimates of the value of physical change in stocks ... should be regarded as subject to a wide margin of error" *1.

Nevertheless, Temin has advanced the hypothesis that inventory investment dominated the trade cycle in Germany in this period *2; the subject cannot be ignored.

What theoretical magnitude do we wish to examine? Temin clearly has an inventory cycle in mind: a cycle where the development of actual, relative to desired levels of inventories provokes behavioural reactions on the part of producers (notably, changes in rates of output and/or purchases of raw materials). Such a model is characteristic of

*1 Central Statistical Office, National Accounts Statictics, Sources and Methods, p 407. Cf. C H Feinstein, Domestic Capital Formation ... pp 32-3.

*2 P Temin, 'The Beginning of the Depression in Germany'. See p 7 above, for note on theoretical literature.

industry and trade, not in the same form, of agriculture. I therefore confine discussion in this chapter (as Temin does) to what Germans term Gewerbe, here specifically defined to include the following sectors: mining, manufacturing, the artisan sector, wholesale and retain trade, commerce, plus, for this chapter only, public utilities, and transport and communications.

Secondly, the behavioural reaction we wish to capture is a real one; so we require deflated estimates of inventory investment. However, especially insofar as monetary constraints may be relevant, current cost of inventory investment (net of the inventory valuation adjustment) will be relevant.

7.2. The Data and its Deflation

The most elaborate available estimates are those pioneered by G Keiser and B Benning and continued in the publications of the Statistisches Reichsamt *3. For mining, manufacturing, public utilities, and transport and communications they derived their estimates by analysis of the balance sheets of stock-exchange quoted companies and of non-quoted companies whose capital exceeded 1 mill.Rm. Adjustments had to be made to allow for (i) special write-offs (eg in connection of merger or bankruptcy); (ii) the fact that not all firms balance on

*3 G Keiser and B Benning, Kapitalbildung und Investitionen in der deutschen Volkswirtschaft 1924-28. That the Stat. Reichsamt continued this series: see article by B Benning in F Burgdorfer (ed), Die Statistik in Deutschland nach ihrem heutigen Stand, pp 755-8.

31 December, in which cases they apportioned net changes in stocks between the relevant calendar years on the basis of extraneous information. The estimates thus obtained for the investigated sample were extrapolated over all firms in the industry with the aid of various relevant statistics - eg proportion of output/assets/employment of the industry accounted for by the sample.

For the artisan sector and retail trade, they based their estimates on small-sample questionnaires, from which inventory - to-employment ratios could be calculated, and extrapolated the results over the relevant branches by aggregate employment data. Inventory investment in wholesale trade was 'guesstimated' by an informal amalgamation of 'balance sheet analysis' and 'questionnaire' methods, and other information *3A.

The estimates in the cited sources do not distinguish 'true' change in size of stocks (at current prices) from inventory valuation adjustment. Hence to obtain estimates of inventory investment at constant prices, one must obtain estimates of inventory levels at the end of each year, deflate these by appropriate price indexes, then take first differences *4.

Which price index? Hoffmann deflated inventories in 'Gewerbe' in aggregate by the annual average value of the wholesale price index *5.

*3A For their methodology, see Keiser and Benning op.cit. pp 174ff.

*4 From Keiser and Benning one can derive estimates of the level of inventories at 1.1.24. These can be cumulated with their successive annual estimates of inventory investment to get levels at the end of each year. See Appendix II pp 399 ff.

*5 Hoffmann ... pp 241-3. His method has the oddity that, to get inventory level estimates, he seems to adopt Keiser and Benning's sample estimates as they stand, rather than seek to derive industry-wide estimates on the basis of them.

This seems inappropriate. Firstly because this index was designed to measure the 'purchasing power of the entire economy' *6, and therefore assigns much too high a weight to the volatile prices of agricultural produce *7. I therefore use the many component indexes of the wholesale price index (plus a few specially derived) to obtain more suitable deflators of stocks in each branch of trade and industry; then aggregate these to get estimates for Gewerbe as a whole *8.

A second criticism of Hoffmann's methods: why use annual average prices? The question of the correct 'intertemporal weighting' of the index decomposes into three related questions:

(i) What is the distribution over the year of the balancing dates of the investigated samples of firms?

(ii) What methods of inventory valuation were commonly used?

(iii) What was the average rate of turnover of stocks?

Appendix I pp 373 ff investigates these questions and reaches the conclusion that the probable range of 'true' deflators would be encompassed by the following three simple intertemporal weightings:

*6 Wi.und.Stat. 1926 p 875.

*7 In the official wholesale price index agricultural prices have a weight of 35%; in the deflator of stocks at 1.1.28, implicit in my estimates, they have a weighting of less than 18%, which seems more appropriate. A further, minor point is that the official wholesale price index is designed to measure flows, not stocks. Wi.und.Stat. 1926 p 876.

*8 See Appendix II.

Designation	Description
AA	Annual Average Prices
2HD	The lower of the December price, and the average July-December Price
4QD	The lower of the December price, and the average October-December price

The resultant estimates are reproduced in Table 1 overleaf. I do not derive separate estimates of the physical change in inventories at current prices. The deflated estimates are better indicators of this than the 'raw' current price estimates (which fail to separate out the inventory valuation adjustment).

These estimates presuppose accuracy in the current value data and in the deflators. Such errors as are inherent in the method of estimating the current value data do not seem in aggregate to be characterised by identifiable bias. However, it appears from statistical testing that the deflators used in the derivation of Table 1 are too variable *9. One possible reason for this could be an inadequate incorporation of labour and overhead costs in the deflators of stocks of work in progress and finished goods held by the mining and manufacturing sector. Abramovitz concluded that in the USA (immediately post-war) these costs should have a weight of at least 18% for this sector *10.

*9 An attempt to use pooled cross section and time series data to regress the deflated stocks on indexes of output, price change, monetary variables, and the corresponding deflators was unsuccessful, except that the deflators regularly displayed significant negative partial regression coefficients. Theoretically, there should have been no relationship.

*10 M Abramovitz, Inventories and Business Cycles ... p 91.

Table 1 Inventory Investment: Current Value (not excluding Inventory Valuation Adjustment) and Deflated Value (1928 prices) Mill.Rm.

Deflator	Stocks at 1.1.24	Inventory Investment in 1924	1925	1926	1927	1928	1929
a. Mining, Manufacturing; Artisan Trades							
CV	8319	2425	1398	-1029	1717	1316	-548
AA	8008*	2482	1258	-92	1429	1062	110
2HD	8008*	2664	1474	-374	1152	1369	175
4QD	8008*	2458	1677	-475	1202	1422	169
b. Public Utilities, Transport and Communications							
CV	828	136	-12	-107	9	-50	17
AA	717*	186	73	-105	2	-67	-5
2HD	717*	276	1	-117	-9	-72	1
4QD	717*	288	-12	-123	-2	-77	3
c. Wholesale and Retail Trade							
CV	6606	3721	879	-598	1649	694	-427
AA	6591*	3471	631	14	1448	356	-36
2HD	6591*	4045	646	601	804	471	246
4QD	6591*	3856	826	615	567	754	206
d. Total: 'Gewerbe'							
CV	15753	6282	2265	-1734	3375	1960	-958
AA	15316*	6462	2157	-93	3107	939	-87
2HD	15316*	6985	2116	112	1947	1768	428
4QD	15316*	6602	2491	17	1767	2099	378

NOTES: CV = Current Value;
AA = Deflated by Annual Average Prices;
2HD = Deflated by the lower of the December price and the average July-December price;
4QD = Deflated by the lower of the December price and the average October-December price.

* In all cases stocks at 1.1.24 were deflated by the average price ruling between January and July 1924.

SOURCES: See Appendix II pp 399 ff.

My deflators take no explicit account of these costs; yet the use of final goods prices as components of the deflators of stocks of many industries *10A introduces them implicitly. It is not likely that contemporary German accounting practice paid much attention to labour and overhead costs *11. I do not think that my deflator is seriously deficient in this respect *11A.

Table 2 Inventory Investment in 'Gewerbe' at Constant Prices, 1927-29; with an Adjustment for the Use of 'Base Stock' Valuation Methods. Mill.(1928) Rm.

	1927	1928	1929
AA	3265	1305	-376
2HD	2492	1892	-355
4QD	2372	2115	-97

METHOD: During the period 1.1.24 to 31.12.26 there were no pronounced and sustained increases in prices; it is unlikely that failure to adjust for 'base stock' methods materially invalidates the estimates in Table 1 for these years.
To effectuate the postulate that after 31.12.26 33% of all stocks in 'Gewerbe' were valued at invariant 31.12.26 prices, I first calculated the deflators implicit in Table 1 for stocks on and after that date; then combined these deflators with the 31.12.26 deflator in the ratio 2:1, and finally redeflated the current value stock level estimates with these new deflators.

*10A See the description of the deflation procedure in Appendix II pp 402 ff below.

*11 The manuals of accounting practice which I read were vague. E Schmalenbach, Dynamic Accounting ... p137 seems to imply that such costs were seldom included. T Ascher, Die Steuerbilanz pp 192-3, 226-8 gives no direct guidance. Cf. the article 'Bilanz' in the Handwörterbuch der Sozialwissenschaften (1956) Vol.2. In inter-war Britain, these costs tended to be ignored (private conversation with Prof. G Whittington). I note that C H Feinstein, Domestic Capital Formation p 32-3 omits these costs from his deflator.

*11A In any case, my objective is to define the relative rates of inventory investment in 1927 and 1928. From Table 1 it can be seen that the major variations in estimates of this relationship arise in wholesale and retail trade, for which this question is irrelevant, not in mining and manufacturing.

A more serious deficiency may perhaps have been introduced by a failure to allow for the possibility that the 'base stock' (eiserner Bestand) method of valuation may have been quite widely used *12. In this case, while prices are rising, a proportion of stocks should be deflated at rather invariant prices.

I have tried to remedy this possible source of error by assuming that after 31.12.26 (between 1.1.24 and 31.12.26 prices never rose significantly over twelvemonthly intervals) one third of the stock was permanently valued at 31.12.26 prices. The results of a rough aggregative exercise conducted on this postulate are shown in Table 2 above. It seems unlikely that the proportion exceeded one third. By no means all firms used this method, and those that did valued only a part of their stocks at the invariant price *12A.

7.3. Evaluation of the Estimates

As can be seen from Table 1, the three estimates of 'real' inventory investment agree well with each other for all years except 1927 and 1928 *13. Thus, the Temin hypothesis about the origins of the

*12 See Appendix I pp 376ff.

*12A Feinstein loc.cit. seems to ignore the possible effect of this valuation method on his deflators.

*13 Briefly, this is because prices were falling in later 1926, rising in later 1927, and falling slightly in later 1928. The 'AA' method thus maximises real stocks growth in 1927 by employing the highest deflator 'at' 31.12.26, but the lowest 'at' 31.12.27; conversely for 1928.

depression rests on narrow statistical assumptions *14. Can we go further than this, to decide which of the specifications is the most accurate?

To what extent does other information provide a check?

Firstly, we might consider the development of imports, or the import surplus. See Table 3.

Table 3 Imports (Constant Prices 1913 = 100
Import Surplus (Current Prices) Mill.Rm.

	Industrial Raw Materials		Semimanu-factures		Finished Goods		Aggregate (Commodities)	
	I	IS	I	IS	I	IS	I	IS
1925	75	3453	96	498	82	-4653	82	3145
1926	66	2034	75	-698	57	-5121	73	-416
1927	99	3754	137	360	105	-5096	105	3313
1928	94	3769	126	-477	115	-5756	102	1876
1929	94	3520	114	-472	105	-6743	97	-36

SOURCE: Hoffmann ... pp 520, 524, 538.

I = Imports; IS = Import Surplus.

This data indicates that imports and the import surplus were less in 1928 than in 1927. Does this mean that deflators yielding such a fall in inventory investment are to be preferred? If for all firms, the geographical distribution of sources of commodity purchases, and of the location of the buyers of their products could be described by identical, continuously declining fuctions of the distance from the location of the firm in question, invariant through time, then the

*14 The deflator applied by Hoffmann (whose estimates were adopted by Temin) corresponds best with the 'AA' variant developed here, except that the former gives agricultural prices a much larger weighting.

import surplus would mirror the opposing flows by which inventories are ac- and de-cumulated. But, of course, the relative importance of domestic and foreign trade fluctuated from branch to branch and period to period. Inspection of foreign trade statistics reveals the overwhelming importance of textiles, of iron and non-ferrous ores and semi-manufactures, and of foodstuffs, in imports (62% in 1928); and of textiles, iron and steel, machinery and chemicals in exports (57% in 1928) *15. Including the whole of the relevant sections of wholesale trade *16, all of the stocks of specialist foreign trade merchants (whether particular to the specified branches or not *16A), and (in the case of imports) the stocks of the relevant retail sections, these groups of branches accounted for only 47% and 36% respectively of inventories in 'Gewerbe' *17. Furthermore, to the extent that (as seems likely) the rise in net exports of finished goods in 1928 offsets a fall in domestic finished goods sales, above all in these branches *18, then the data in Table 3 will exaggerate the decline in inventory investment. And, moreover, the relationship between deflated inventory investment in 1927 and 1928 (using the Keiser-Benning/Stat. Reichsamt data) is invariant to the deflator used, precisely in the cases of chemicals and engineering (where a higher rate in 1928 is shown by all methods). Only for foodstuffs and textiles is the relationship

*15 Hoffmann ... pp 520, 522, 524, 526.

*16 On the argument that an unknown proportion of these stocks was involved in foreign trade.

*16A The proportion of these merchants' stocks pertaining to the branches in question cannot be distinguished.

*17 Calculated from data in Keiser and Benning op.cit. cited on p 399

*18 For the decline in domestic real textile sales see Hoffmann ... p 662; Konj.Stat.Hdb.(1936) p 283. For iron/steel and machinery see below p 292-4 .

sensitive to the deflator used; in the former case the sensitivity is opposite to that of the aggregate estimates for all industry *19. Thus, though imports and the import surplus did fall 1927-28, the relevance of this to the choice of a correct deflator for inventories is dubious *20.

A second check might be provided by the 'inventory scissors' diagram reproduced and described in Diagram 7/I overleaf. If the area between the 'increase' and 'decrease' curves represents real inventory investment (a dubious assumption, given the derivation of these curves) then it drops from the equivalent of c.3¾ 'squares' in 1927 to c.2 'squares' in 1928. But, on this basis, <u>disinvestment</u> in 1926 (at 5 'squares') exceeded positive investment in 1925 and 1927! Thus the diagram seems to exaggerate declines in inventory investment *21.

Lastly, the Deutsche Bank published a survey of inventory levels in trade and industry *22. Its object seems to have been to ascertain the extent of 'irrational' or excessive inventory holding, which was tying up scarce capital. It is based on the usable returns to a questionnaire, received from about 800 firms. Branches of industry

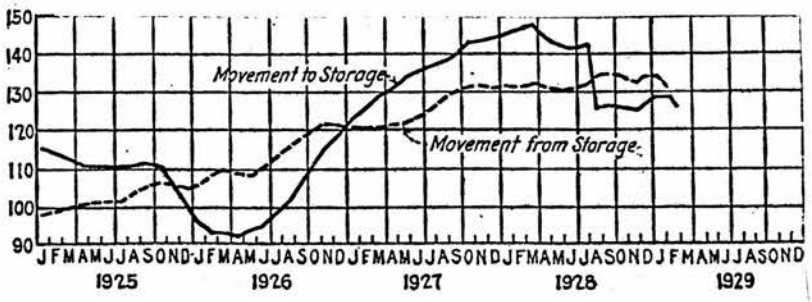
*19 Lack of space prevents my reproducing the detailed disaggregated estimates which sum to the series in Table 2. The bulk of the fall in inventory investment in 1928 is, from that Table, clearly in <u>domestic</u> trade.

*20 In 1924-25 the commodity import surplus increased somewhat (<u>St.Jb.f.d.Dt.R.</u> 1930 pp 192-3) whereas the rate on inventory investment fell drastically!

*21 It is criticised in <u>DV</u> III 15.3.29.

*22 My source for this index in <u>FZ</u> 26.6.29, article 'Unrationelle Lagerhaltung'. Its preparation was supervised by Dr Melchior Palyi.

Diagram 7/I Inventory Scissors



SOURCES: Diagram: E Wagemann, Economic Rhythm, p 152. (ultimate: Inst. f. Konjunkturforschung)
Description: Vjh.Konj.forsch. 1927 H2 p 28 (footnote); 1929 H1A p 25 (footnote).

NOTES: Movements to Storage is derived from the following indicators: Aggregate Production Index of Inst.f.Konj.forsch. Commodity Imports; % Unemployment in Trade Unions in non-seasonal trades; Credits extended by large Commercial Banks. Movements from Storage is derived from the following indicators: Seasonally adjusted Turnover in retail branches holding large Stocks; Currency in Circulatinn; Commodity Exports; All series are adjusted for price change.

Table 4 Inventory Levels and Inventory-to-Turnover Ratios: Deutsche Bank Survey

NB In all cases 1925 = 100. Therefore it is omitted.

	Stocks			Stock-to-Turnover Ratio		
	1926	1927	1928	1926	1927	1928
Aggregate	92	113	115	107	102	107
Size Distribution (by Equity Capital)						
below 1 mill.Rm.	98	114	115	115	119	127
1 - 5 mill.Rm.	97	119	89	116	116	128
5 - 10 mill.Rm.	95	99	106	119	105	99
above 10 mill.Rm.	98	101	103	111	101	105

SOURCE: Frankfurter Zeitung 26.6.29, article, 'Unrationelle Lagerhaltung'. (Ultimate, Deutsche Bank).

were excluded where stocks were very dependent on the harvest, or consisted largely of work in progress. Where possible, price changes were eliminated. The aggregated results are reproduced in Table 4. See too p 410 of Appendix III. They appear to indicate a severe drop in inventory investment in 1928. But they too indicate a much severer drop in 1926 than any of the deflated variants in Table 1 (ie relative to inventory levels). Furthermore, the survey indicates a drop in turnover rates in 1928 by comparison with 1927, whereas the more comprehensive Hoffmann data indicate a rise. Thus, as more fully explained in Appendix III, the survey probably exaggerates the reduction in inventory investment between these two years.

To conclude: although on the surface these three 'checks' all support the proposition that 'real' inventory investment was significantly less in 1928 than in 1927, on closer inspection they prove rather little.

We must therefore enquire directly: which of the deflators is likeliest to be correct? Given the rate of turnover of stocks, and the concentration of the balancing date scatter at 31.12 (deduced, admittedly from a very small sample *23), the 'AA' deflator seems to

*23 Although Table I/1 p 375 (Appendix I) does not record such a case, the most plausible amendment to the postulated concentration of balancing dates at 31.12 seems to me that a significant number of firms balanced at the end of the public fiscal year - 31.3. I experimented with the hypothesis that 50% of stocks in mining and manufacturing pertained to a 31.3 balancing date, and 50% to 31.12 (this matter is irrelevant to most other sectors, for which estimates of stock levels at 31.12 were directly elicited by questionnaire). When I applied this hypothesis to the data via the model developed in Appendix I (pp 385 ff), I found results not significantly different from those in Table 1 p 214 above.

incorporate much too wide a range of months. '4QD' probably errs in the other direction. The '2HD' deflator, as adjusted after 1926 to allow for the influence of the 'base stock' valuation method, seems to me the most probable *24. But the estimates are demonstrably very sensitive even to small errors.

7.4. The Relationship between Desired and Actual Inventory Levels

This question is obviously at the heart of the dynamics of the inventory investment cycle. In this section, I wish to substantiate the view that in early 1924 desired inventories were greatly above actual levels; that by mid 1925 the reverse relationship had emerged, and required a serious 'liquidation crisis' to eliminate it. The discrepancies between desired and actual stocks were less acute in 1927-29, but excess stocks do seem to have emerged again during 1928.
These assertions can be substantiated in two ways. Firstly from contemporary comment; and secondly, indirectly, by examination of the inventory-to-turnover ration, and of price behaviour.

Firstly, the evidence of contemporary comment.
Aggregative evidence, that inventories in Gewerbe were in disequilibrium, is most clear-cut for early 1924 - when stocks were said to be exhausted

*24 Thereby I include in my deflator more months of the year than Feinstein or Abramovitz (operibus citatis), or than the current practice of the UK National Accounts (Central Statistical Office loc.cit.). See too *12A p 216 above.

as a result of the inflation - and for 1925/26, when the liquidation of excess stocks was widely reported *25. Aggregative evidence of stocks disequilibrium during 1927-29 is not so plentiful. However the Inst.für Konjunkturforschung did keep a watch on aggregate stock levels.

It attributed the 1927-29 upswing to a restocking boom *26, but at no time in 1927-29 did it regard stocks as seriously excessive. It thought that stocks reached a peak in late 1927, and in part attributed the recession of 1928-29 to a slow reduction of stocks *27, and blamed the very slowness of the decline for the prolongation of the recession *28.

A more detailed survey was made of comments on the levels of stocks in individual industries particularly with reference to 1927-29. Such comments are usually confined to industries producing "to stock" for obvious reasons. Textiles are the obvious place to look. An inventory cycle model is implied in much of the treatment of this sector by the Institut für Konjunkturforschung *29. In November 1926 we read of continuing liquidation of stocks, and restocking characterised the first half of 1927 *30. By February 1928 raw cotton stocks were

*25 Rather than listing the many possible references in trade journals and contemporary newspapers, I note merely G Keiser and B Benning op.cit. p 19; G Clausing, Die wirtschaftliche Wechsellagen ... pp 50-59; Agent-General for Reparations, Report for 1924/25, p 17.

*26 Vjh.Konj-Forsch 1926 H3 p 39; 1927 H3 p 5.

*27 Ibid. 1927 H4 p 7; 1928 H2A p 3; H3A p 7.

*28 Ibid. 1929 H4A p 8.

*29 Ibid. 1926 H2 pp 33-7; H4 p 62, and many other places.

*30 Ibid. 1926 H3 p 55; 1927 H2 p 48.

regarded as dangerously high, though textile stocks in general were near equilibrium *31. Prices did not break, as in 1925/26, but by mid-year the Institut did blame an "inventory cycle" for the current decline in textile output *32. By February 1929 the Institut held that current stock position could justify an increase in output despite constant sales - ie that stocks were marginally deficient *33. The trade journals of the textile industry are as pre-occupied with stocks as the Institut. Spinner und Weber speaks of over-optimistic purchasing by the trade in early 1925, leading to excess stocks in wholesale and retail, whose liquidation in 1926 was seen as the basis for the next upswing *34. In mid-1927 it was thought that "stocks in the trade are none too plentiful, as a consequence of protracted cautious buying, and thus the inclination to obtain a more adequate supply is everywhere very lively" *35, but the danger that this inclination might produce excessive stocks and ultimately reduce purchasing was also noted. By the autumn the journal noted a slackening of demand, partly attributed to monetary factors, and was warning manufacturers of the dangers of entering into long-term contracts (presumably for supplies) *36. While in November 1927 the trade was still thought to be expanding its stocks *37, in October 1928 we read

*31 Vjh.Konj-Forsch 1927 H4 pp 56, 58.

*32 Ibid. 1928 H2B pp 20-21.

*33 Ibid. 1928 H4B pp 19-20.

*34 Spinner und Weber 1926 No 3 pp 16-20; No 15 p 22; No 33 p 21.

*35 Ibid. 1927 No 27 p 24.

*36 Ibid. 1927 No 46 pp 30-31; See also Textil-Woche 9.9.27 p 12.

*37 As for *36.

that the recession in textile manufacturing is due to the extremely cautious buying, and the reduction of stocks by the trade over the past year; however stocks were now low enough to warrant optimism for 1929 *38. It would be tedious to repeat the similar line of analysis developed by the textile retailers' journal *39, except to note a tendency to characterise the other chap's stocks as excessive *40, and to repudiate allegations of excess stocks amongst their own clientele *41. The journal insists that in 1928 cautious buying will enable the trade to prevent the price collapse of 1925/26 *42, but articles such as "Measures against Dumping" (Schleuderkampf) in early 1929 betray uneasiness *43.

Comments on stock levels may be most frequent in the textile sector; they are also numerous for most other branches of industry and trade outside of the heavy and engineering branches. Even within heavy industry, coal stocks at the pit head are subjected to continuous scrutiny by the Institut für Konjunkturforschung *44. The English strike was instrumental in clearing excess stocks in 1926 *45, but

*38 Spinner und Weber 1928 No 43 p 19; 1929 No 1 p 27.

*39 See Textil-Woche 18.3.27 p 12; 12.8.27 p 12.

*40 Ibid. 2.12.27 p 32 (with ref. to manufacturers' stocks).

*41 Ibid. 9.3.28 p 9.

*42 Ibid. 10.8.28 p 8.

*43 Ibid. 1.3.29 p 13; see also 19.4.29 p 7.

*44 See almost every issue of Vjh.Konj-Forsch. in the section on Steinkohle. The actual levels can be checked in Konj-Stat.Hdb. (1936) p 208.

*45 Vjh.Konj-Forsch. 1926 H3 p 50-51.

from mid-1927 they began to rise again *46, though not to dangerous levels until late 1928 *47. The extra cold winter of 1929 and improved demand in the following summer helped to trim them again *48. Other industries are listed at random. Stock levels were scrutinised in the furniture industry *49, and the industry itself complained of excess stocks at the end of 1928 *50. In the paper-making industry a definite inventory cycle was observed *51, and in 1928 saw mills showed tendencies to develop excess stocks *52. The IfK believed in 1928 that stocks in the glass and ceramics industry were excessive (this could be a consequence of the rapid mechanisation of the industry) and notes attempts to trim stocks in 1929 *53. The trade journal of this branch also describes the elements of an inventory cycle in the glass and ceramics trade stocks in 1927, with its repercussions on industrial output *54. An inventory cycle is detected in the leather and leather goods industries; a trough in late 1926 rising to a peak in autumn 1927, and swinging down thereafter until mid-1929, when some

*46 Vjh.Konj-Forsch. 1927 H1 pp 41-5; H4 p 48.

*47 Ibid. 1928 H4B p 11.

*48 Ibid. 1929 H2B p 12.

*49 Ibid. 1926 H4 pp 67-8; 1927 H4 pp 67-8.

*50 Jahresbericht der Industrie - und Handelskammern des Ruhrbezirks: Das Wirtschaftsjahr 1928 pp 237-8.

*51 Vjh.Konj-Forsch. 1927 H4 p 70 (low stocks); 1928 H4B p 30 (high stocks). See data in Konj-Stat.Hdb. (1936) p 270.

*52 Keiser und Benning op.cit. p 55.

*53 Vjh.Konj-Forsch. 1928 H3B p 23; H4B p 24.

*54 Sprechsaal 1929 p 196; 338-9.

tendency for demand for hides to increase was observed *55. Other industries for which signs of excess stocks are mentioned are Building Materials (1926), where excess stocks in late 1928 were considerably reduced by mid-1929 *56, industrial vehicle oils (excess stocks predicated of 1926) *57, small iron and steel goods (1928) *58, small-scale clothing manufacture (1926) *59, and a number of wholesale and retail branches *60. (In connection with retail, however, both Benning und Nieschlag, and the Deutsche Bank survey, indicate that the stock-to-turnover ratio fell in 1928 and 1929 *61).

There is thus fairly general direct evidence of the development of some degree of excess stocks during 1928, but the evidence also conveys the impression that this excess was not perceived as nearly so severe as in 1925/26. It is what the decision-makers perceive that counts in the determination of output.

The indirect evidence of the stock-to-turnover ratio broadly confirms the findings from the direct evidence.

Estimates of this are provided in Table 5 below. The first, designated "DB" is reproduced from Table 4 above (p 220). The second, designated

*55 Vjh.Konj-Forsch. 1927 H2 p 52; 1928 H1B pp 22-5; H4B p 23; 1929 H2B p 26.

*56 Ibid. 1928 H3B p 26; 1929 H2B p 30.

*57 Keiser und Benning op.cit. p 51.

*58 Ibid. p 74.

*59 Ibid. p 133.

*60 Ibid. p 138-143. See too Vjh.Konj-Forsch. 1929 H2B p 35.

*61 Benning und Nieschlag op.cit. p 26.

"St.Ra/H" is calculated by averaging two successive estimates of 'end of year' inventories and dividing the averages by estimates of annual output in 'Gewerbe'.

Table 5 Stocks-to-Turnover Ratios in 'Gewerbe' Constant Prices. 1925 = 100

	1925	1926	1927	1928	1929
DB	100	107	102	107	n.a.
St.Ra/H	100	116	96	103	103

SOURCES: 'DB' = Deutsche Bank Survey - see Table 4 p 220 above.
St.Ra/H: Inventory levels: Table 1 p 214 above (cumulated totals.
Output: Appendix III, Table III/2 column (5), p 412 and explanation attached thereto.

If desired inventory levels are a fixed proportion of real output, then probably both series display the development of excess stocks in 1926, and again in 1928-29. The current price ratio is probably more relevant to business decisions, but good current price output data are not to be had.

The lower line of Table 5 (based on the more comprehensive data) also supports the belief that the degree to which stocks were excessive was more serious in 1926 than in 1928 or even 1929.

Some confirmation of the hypothesis about the relations between desired and actual inventory levels is provided by examination of the price indices. *62. When stocks are perceived to be excessive, prices should

*62 References to sources where price indexes are to be found are given in Appendix II p 399 .

(abstracting from monopoly influences) be perceived to fall (ie relative to the otherwise predictable trend). The fall should be the severer, the more serious the excess was perceived to be.
The aggregate price index for industrial raw materials and semi-manufactures confirms these expectations. In important respects the temporal pattern of price fall of its component indexes mirrors contemporary comment about the timing of the development of excess stocks in 1928-29: textile raw material and semi-manufactures prices broke before those of timber (saw-mills) and of building materials, for which evidence of excess stocks postdates that for textiles. In no case was the price fall in 1928-29 as severe as that in 1925-26.

The aggregate finished goods price index does not follow this pattern. The index rose till the first quarter of 1930. The difference between this index and that for industrial raw materials and semi-manufactures lies chiefly in the importance of labour and overhead costs. Labour costs were rising steeply in this period as the fifth chapter showed. The fact that, despite this, the rate of increase of finished goods prices appears to have moderated after late 1928 could itself be indicative of a tendency for excess stocks to develop; in textiles, where stocks of finished goods are important, prices fell from early 1929.
None of this evidence of the development of prices is conclusive, but it is consistent with the postulated evolution of the relationship between desired and actual stocks.

Within this broad picture, can the point in 1928 at which excess stocks began to develop be more closely defined?

The direct evidence of contemporary comment reveals different timing for different industries, as just noted. Different sources do not always agree about the timing for individual industries. The stock-to-turnover ratio does not help, being annual only. Evidence from the price data could be adduced only if the lag structure of the response were well established in other research; in any case this evidence also differs for different industries. If, however, a guess is necessary about the turning point in aggregate inventory investment, the 'inventory scissors' diagram on p 220 above provides a clue, which is broadly consistent with all the other evidence I have cited (including the ex post statistical data). In general, it seems to me that excess stocks did not begin to develop until the second quarter, or middle of 1928 *63. The evidence cited below *64, which relates the growing trade tension in trade credit during later 1927 and 1928 to continued inventory investment, seems to confirm this view.

7.5. Inventory Investment and the Trade Cycle

It is clear that in quantitative terms inventory investment, having sustained the upswing from early 1924 to mid 1925, dominated the subsequent collapse in 1925-26, in the sense that the absolute change

*63 Thus this turning point probably postdates other evidence of the onset of recession - notably that of the domestic new machinery orders index. See below pp 246ff . The textile sector is however an exception: inventory investment here probably turned down from later 1927.

*64 See pp 233 below.

in this quantity was far greater than the change in all other components of the National Accounts *65. Inventory investment dominated the gross movements of components of the Accounts in 1928, only on the evidence of those estimates which result from the deflation of the current value data by annual average prices. If we use the more plausible July-December/December price spread to deflate the data, then the absolute change in the rate of real inventory investment between 1927 and 1928 is no greater than that of a number of other components - exports or government expenditure, for example *65A. And changes in other types of investment are equally important. It becomes implausible to attribute the beginning of the depression in Germany solely to an inventory cycle, in the manner of Temin.

7.6. Determinants of Inventory Investment

The Temin - Falkus controversy *66 hinges on the role of monetary factors in the inventory cycle. The following points are relevant, but do not, to my mind, point to a clear conclusion.

*65 Inventory investment in 'Gewerbe' was 6½ mrd.Rm. in 1924; 2 mrd.Rm. in 1925, and nearly nil in 1926. See Table 1 p214 above, line '2HD'. In these years, gross fixed investment at current prices in the entire economy was 7.1, 10.3, and 10.7 mrd.Rm. respectively. See Table 2 p 11 above, and St.Jb.f.d.Dt.R. 1938 p 565.

*65A See Table 2 p 91 above.

*66 P Temin op.cit.; M E Falkus, 'The German Business Cycle of the 1920s'. See too the comments of Temin/Falkus/Balderston in the Ec.H.R. XXX(1977) pp 159ff.

i) Whether or not isolated modern researchers obtain significant coefficients for interest rates in inventory investment regressions, Temin is surely right that the consensus finds no such relationship. But can these findings, obtained in the relatively liquid environment of the postwar world be applied to the 'freak' monetary environment of post-stabilisation Germany?

ii) Fundamental to the Temin - Falkus controversy is the question of whether monetary factors were decisive in the turning point of mid 1925. Temin denies their influence *67 - though on unsatisfactory grounds; Falkus asserts it *68. I myself find it hard to detect a link between the cessation of the foreign capital inflow, and the 'open market' action of the Reichsbank *69 in early 1925, and the turning point in inventory investment. Interest rates, pace Falkus, hardly rose *70. Only if businessmen's desired levels of inventories had been predicated on expectations of continued future falls in rates, would the cessation of this decline have precipitated such a reversal of stockbuilding. While, in the long run, businessmen evidently did expect such a 'normalisation' of interest rates, it seems unlikely that they were so certain of immediate reductions that they based their short run inventory policy upon it.

iii) Nevertheless, it is hard to deny all relationship. Unless all contemporary comment, and the bankruptcy statistics are to be

*67 Temin op.cit. p 244. His proof rests largely on examination of the ex post Balance of Payments annual data, and seems to involve the misconception that the crisis began in 1926.

*68 Falkus op.cit. pp 459ff.

*69 See Chapter 2 pp 28ff above.

*70 Falkus op.cit. p 460; "... interest rates began to rise appreciably ..." Data on interest rates is given in Table 1 p20 above.

discounted, the 1925/26 recession was greatly aggravated by lack of liquidity. This factor will not explain the origin of this recession: illiquidity had been an enduring fact of life since November 1923. If, however, for some other reason inventory investment slackened, firms may have lacked the reserves to sustain this illiquidisation of stocks, and thus a bankruptcy crisis have ensued which in turn accentuated the price collapse and the decumulation of stocks. That some such mechanism operated in 1925-26 seems most plausible *71. In 1927 the reverse seems to be discernible. The increasing problems of securing prompt payment, referred to earlier *72, are most naturally associated with continuing inventory investment:

> "Continued increases in output, at the same rate as in the recent past, would rather bring the tension to a head, firstly, through malinvestment ... and also through increased inventory accumulation, which according to various opinions has already reached significant levels, especially in the textile industry; and which brings with it increased illiquidity. Both these factors could mean that the already very perceptible tension between the demand for and the supply of capital could increase further, and the payments of debts would suffer. More cautious inventory investment would prevent serious dislocation of the system " *73.

This reflects a possible two-way relationship. The stubborn persistence of inventory investment increased the scarcity of liquid capital. But to what degree did this latter scarcity react to inhibit inventory investment? There is much contemporary comment, especially in the textile trades, which advocated and commented on 'hand to mouth' buying, in view of the financial conditions. This seems to indicate some

*71 See the comment in Spinner und Weber 1926 No 3 p 17.

*72 See above pp 42, 44.

*73 Wk 7(1928) p 6.

reaction of monetary variables upon inventory investment, though the importance is hard to quantify *74.

Monetary determinants, then, will not explain the turning points satisfactorily, either in 1925 or in 1928. What will?

A satisfactory hypothesis lies to hand in the form of a heavily damped 'inventory cycle' of the Metzler variety. Accepting that in December 1923 stocks were exhausted, due to the last frenetic months of the inflation *75, the investment of 1924-25 represents a vigorous 'restocking boom', which, as spelt out in the 'multiplier-accelerator' dynamics, overshot, and generated the cessation of inventory investment during 1925-26. This, in turn, generated a renewed upswing from early 1927. But the low values of the short-run multiplier, and the flexible orders and production lags substantiated by modern research *76 imply that the 'echo effects' of the original inventory cycle would die away quite quickly; thus the 1927 inventory accumulation was more moderate than that of 1924-25; and the subsequent inventory recession was milder than that of 1925-26 *77.

This 'real' model seems to me to capture the essence of the inventory behaviour of this period. But equally, it seems to me that the pattern was intensified by the liquidity crisis which dominated the German economy in this period.

*74 See references *35 - *43 above and Wk 13(1934 p 25, 'Lagerauffüllung im Konjunkturanstieg', where considerable importance is attached to credit conditions.

*75 See *25 p 223 above.

*76 See p 7 above.

*77 These 'echo effects' are probably best viewed as having been superimposed on a secular growth trend in the economy. Thus real stocks hardly ever fall absolutely; only their rate of growth does.

CHAPTER 8 FIXED INVESTMENT IN MINING, MANUFACTURING, TRADE AND COMMERCE

8.1. Introduction

The German umbrella term Gewerbe will again be used in this chapter, roughly as in the last; it will denote mining, manufacturing, trade and commerce, but here will exclude public utilities and transport and communications, whose fixed investment was considered in Chapter 6.

Of the immediate reduction in aggregate fixed investment between 1928 and 1929, two-thirds occurred in 'Gewerbe' *1. Thus the analysis of this chapter is central to my subject.

Contemporaries offered the following explanations of this investment recession:

i) the 'natural conclusion' of a rationalisation wave *2.

ii) the emergence of excess capacity *3.

iii) the increasing difficulty of external financing, at home and abroad *4.

*1 See Table 1 p 239 .

*2 E Welter Stockung ... p 29; MdW (1928) pp 1479ff, 'Abklingende Konjunktur'.

*3 E Welter loc.cit.; A Reithinger, Stand und Ursachen der Arbeitslosigkeit ... p 21.

*4 E Welter loc.cit.; G Clausing, Die wirtschaftliche Wechsellagen... pp 63ff,124ff; E Varga, as quoted in J Kuczynski Studien zur zyklischen Uberproduktionskrisen ... pp 78, 83.

iv) wage increases, rising social insurance contributions and taxes, which constricted the internal cash flow *5.

There could hardly be a more comprehensive range of explanation than this!

In this chapter I set the analysis in the general framework of a 'capital stock adjustment' model *6; the desired rate of net fixed capital formation is a function of the difference between the desired and the actual fixed capital stock, and of the speed at which this difference is eliminated. The desired stock will be governed, given the state of the technology, by the expected level of output *7, and long run expected factor costs. The relationship between the desired and the actual stock will also, in industries of rapid technical change, depend on the obsolescence of the actual stock. The desired speed of transition toward the desired stock will be governed by the fact that the cost of capital goods is probably an increasing function of capacity utilisation in the capital goods industries; also by the possibility

*5 G Clausing op.cit. pp 64-5; see too below pp 311 ff.

*6 A good general discussion is to be found in Michael Evans, Macro-Economic Activity pp 73 (especially 82) ff.

*7 In strictly cartellised industries the plant capacity per se is a counter in the bargaining for quotas; hence excess capacity may not be so salutary a deterrent to investment. Cf. (on the coke cartel) E-A III/1 Die deutsche Kohlenwirtschaft pp 31ff; (tube cartel - competition between Krupp, Mannesmann and Vereinigte Stahlwerke) Wd 14/1 (1929) pp 2217, 2261, also E-A III/3 Die deutsche Eisenerzeugende Industrie, pp 23ff. Moreover, in new industries, or those whose technology is undergoing rapid change, and hence market shares are uncertain, a similar process may obtain. See below with respect to glass and rayon, pp 257,268.

that the time structure of investment activity may affect the cost of finance. If the cost of finance, for example, is believed to be temporarily high, investment projects may be delayed *8.

The observed reduction in fixed investment activity may therefore have broadly three causes. Firstly, a decline in capacity utilisation (actual, or expected, once currently constructed plant becomes operational). Secondly, an improvement in the technical characteristics of the current stock, relative to the desirable. Thirdly, an increase in the cost or reduction in the availability of external/internal finance. (A fourth possibility - lack of capacity in the capital goods industries - is irrelevant here).

Before proceeding to the analysis, the characteristics of the available data require evaluation; this is done in section 2. In section 3 the question of the capacity utilisation of the existing stock, in section 4 the rate of its technical improvement are examined. In section 5, I review 'exogenous' causes of a reduction of sales by Gewerbe during 1927-29. In sections 6 and 7, I consider the degree to which external and internal financial conditions imposed constraints. The whole argument is brought together in the eighth and final section.

*8 Or the maturity of the current financing arrangements shortened, but this process has its limits. The normal method was to finance work in progress by bank credits, consolidating these by capital issues at gestation. P B Whale, Joint Stock Banking in Germany, pp 34ff.

8.2. Investment Activity and Intentions

8.2.1. Statistics of Investment Activity

The rate of fixed investment activity can be measured either from the ownership side (ie from an examination of owners' records of changes in the value of their real fixed assets), or from the supply side (ie from estimates of net domestic sales - production plus net imports - of capital goods) *9. Since, in this period, the output statistics are poor for many capital goods industries, the 'ownership' estimates are generally considered to be the better. Furthermore, they alone offer estimates of the capital stock as well.

8.2.1.1. Ownership Estimates. A collection of these is reproduced in Table 1 overleaf. In practice, all such statistics derive from the findings of Keiser and Benning, subsequently continued by the Stat. Reichsamt *10. Their general methodology has already been described *11, but some features particular to fixed investment remain to be noted.

a) Keiser and Benning present 'net' estimates of fixed investment activity; but this is defined according to contemporary accounting concepts, except that such special 'write offs' as seem to reflect only accumulated obsolescence, or loss of value perceived in

*9 Cf. the discussion in C H Feinstein, Domestic Capital Formation... pp 11ff, 57ff. 'Supply Side' estimation is also termed 'Commodity Flow'.

*10 G Keiser and B Benning, Kapitalbildung und Investitionen in der deutschen Volkswirtschaft 1924-28.

*11 pp 210 ff above.

Table 1 Fixed Investment "Ownership Estimates"

A. Statistisches Reichsamt Aggregated Estimates
Gross Investment Mrd.Rm. Current Prices

	(i) Manufacturing Mining	(ii) Other Sectors (ie Trade and Commerce)	(iii) Public Utilities	(iv) Entire Economy
1924	1.4	1.0	0.4	7.2
1925	2.2	1.4	0.8	10.3
1926	1.8	1.3	0.9	10.7
1927	2.2	1.7	0.7	13.0
1928	2.6	1.7	1.0	13.7
1929	2.0	1.4	1.1	12.8
1930	1.6	1.1	0.7	10.4

B. Hoffmann "Net Investment" "Gewerbe" Current Prices Mrd Rm.

	(i) Total	(ii) Buildings	(iii) Equipment
1924	1.7	1.1	0.6
1925	2.8	1.2	1.6
1926	2.3	1.1	1.2
1927	3.1	1.5	1.7
1928	3.5	1.4	2.1
1929	2.7	1.5	1.2
1930	1.6	1.2	0.4

Hoffmann "Net Investment" "Gewerbe" 1913 Prices Mrd Rm.

	(iv) Total	(v) Buildings	(vi) Equipment
1924	1.3	0.8	0.5
1925	1.9	0.7	1.2
1926	1.6	0.7	0.9
1927	2.1	0.9	1.3
1928	2.2	0.8	1.6
1929	1.7	0.8	0.9
1930	1.0	0.7	0.3

C. Gehrig Gross Investment Entire Economy Current Prices Mrd.Rm.

	(i) Total	(ii) Buildings	(iii) Equipment
1924	7.2	2.7	4.5
1925	10.3	5.2	5.1
1926	10.7	5.1	5.6
1927	13.0	6.3	6.7
1928	13.7	6.8	6.9
1929	12.8	6.0	6.8

D. Krengel Mining and Manufacturing West Germany only Mrd Dm. 1950 Prices

	(i) Gross	(ii) Net
1924	1.4	0.1
1925	2.0	0.7
1926	1.7	0.3
1927	2.1	0.8
1928	2.3	0.9
1929	1.8	0.3

SOURCES:
A. Stat. Jb.f.d.Dt.R. 1938 p 565.
B. Hoffmann pp 246-7.
C. G Gehrig, 'Eine Zeitreihe' pp 35-49.
D. Krengel, Das Anlagevermögen ... p 113.

connection with financial reconstruction, and merger, have been written back in (as not representing 'economic' reality) *12. Whether, in spite of this, their estimates reflect an economically relevant definition of 'net' investment, is dubious, especially in a period when the bulk of investment seems to have been undertaken with a view to modernisation/rationalisation. The Statistisches Reichsamt's published estimates of gross investment probably reflect even net investment more accurately *13.

b) The regulations governing the form of commercial balance sheets (Handelsbilanzen) permitted the immediate writing off of large expenditures on machinery and tools *14. Keiser and Benning believed that no adjustment could be made for this. It will not matter, unless the firms which adopted this practice were thereby concealing an atypical pattern of investment behaviour; it may however distort the apparent distribution of investment between branches of industry: eg apparently depress that in engineering.

c) New capital stock is presumably activated in the first balance sheet published after it has come into operation. Thus, if the lag between the peak of investment activity and its conclusion exceeds c.six months, the series under review may lag behind activity somewhat *15.

*12 Keiser and Benning op.cit. p 174.

*13 Gross investment is, in any case, the relevant concept from the standpoint of employment generation.

*14 Thus a number of firms (eg Siemens) habitually entered the value of their entire machinery stock at 1 Rm. Tax allowances were also generous, if not quite so: Handwörterbuch der Sozialwissenschaften (1956) Vol II p 248, 'Bilanz'.

*15 Lags in the investment process are discussed below pp 249 ff.

Keiser and Benning make this point explicitly with reference to heavy industry and chemicals:

> "For chemicals, coal mining and iron and steel the rate of investment for 1928 is far above the 1924-28 average. This bunching of investment activity is to be explained by the fact that, as a consequence of the great extent of the new construction programmes - in many cases complete new works complexes were built - the investment process did not reach a conclusion, and hence appear in the balance sheets, till relatively late in the upswing". *16.

d) In 1924-25 the bulk of firms revalued their balance sheets in Reichs (= Gold) mark *17. The estimates of the capital stock in 'Gewerbe' obtained by Keiser and Benning and the Stat.Reichsamt depend on these revaluations. From the discussion in Appendix IV pp 419 ff it seems that the initial balance sheet valuations were probably excessively conservative, relative to the valuations at which subsequent investments were activated, perhaps more particularly in the case of smaller firms.

Subsequent researchers adopt the Stat.Reichsamt estimates to a greater or lesser degree. Krengel *18 adopts its gross fixed investment estimates for mining and manufacturing directly, employing his own straight-line depreciation scheme to derive net estimates. He constructs his own capital stock estimates in such a way as to be consistent with

*16 Keiser and Benning op.cit. p 79. In Vjh.Konj.Forsch. 1930 H3A p 73 the same point is made, with reference to the whole of industry.

*17 Cf. P Mueller, Die Goldbilanzumstellung ...

*18 R Krengel, Anlagevermögen, Produktion ... (1958) pp 73ff.

certain relevant criteria *19.

Gehrig *20 likewise adopts the Stat.Reichsamt gross fixed investment estimates, this time for the whole economy, and builds up a capital stock series by cumulating these with independently derived estimates of scrapping.

The derivation of Hoffmann's estimates *21 is something of a puzzle. He cites only Keiser and Benning and the Stat.Reichsamt as his sources, stating that he adopted their estimates of net fixed investment in Gewerbe directly; but I am unable to effect a reconciliation between his estimates and those of his sources *22. However it would be more consistent with his general approach *23 to suppose that he applied to the Stat.Reichsamt gross data his own declining balance depreciation scheme, to derive new net investment estimates. As he does not ever publish his precise depreciation schemes, his methods cannot be reconstructed. His capital stock estimate for 1924 seems to have been 'guesstimated', probably with some respect to Keiser and Benning's estimate. Since it indicates a 20% reduction in the constant-price fixed capital stock in 'Gewerbe' between 1913 and 1924, it seems to me, even allowing for territorial loss, to be on the low side *24.

*19 Described in more detail on pp 277 ff below.

*20 G Gehrig, Eine Zeitreihe für den Sachkapitalbestand pp 13ff.

*21 Hoffmann ... pp 241ff.

*22 There are problems owing to differences in the categorisation of the data, but these would not explain the discrepancies.

*23 Hoffmann ... pp 215-7.

*24 Ibid. p 245. Capital stock in 1913 = 85.2 mrd.M; in 1925 = 67.6 1913 mrd.M.

8.2.1.2. 'Supply side' estimates. Both Hoffmann and Gehrig subdivide their fixed capital formation series into investment in buildings on the one hand, and in machinery and equipment on the other. They then estimate one of these by 'supply side' information, and the other as a residual, given the aggregate 'ownership' estimate.

Gehrig built up 'supply side' estimates of investment in machinery and equipment from estimates of the sum of the output plus net imports of mechanical and electrical engineering, precision engineering (Feinmechanik) and optical, vehicles, and shipbuilding *25. Reasonably good output data are available only for vehicles and shipbuilding; for the rest estimates had to be cobbled together out of a variety of disparate bits of information, interpolations, and assumed proportionalities between one series and another. No allowance is made for changing proportions of consumer sales in the output mix of any of the relevant branches.

Hoffmann built up supply side estimates of investment in buildings from the comprehensive data of the Stat.Reichsamt *26. However the subdivision of this data between Gewerbe and the Public Sector is somewhat less secure than is the aggregate. It depends on the splicing of results derived from records of large cities during 1924-29, to the results of surveys of the entire Reich from 1929 on. The rather strange 'dip' in his estimates of buildings investment in Gewerbe in 1928, not paralleled in any other information, makes one wonder whether any 'slippage' occurred at the point of splicing.

Gehrig then derived his estimate of investment in buildings as a

*25 G Gehrig op.cit. pp 14ff, 40-45. See Table 2A(iv) p 244 .

*26 Hoffmann ... pp 228ff. See Table 1B(ii) and (v) p 239 .

Table 2 "Supply-side" Indicators of Fixed Investment

SOURCES:

A. Domestic Purchases of Steel, Cement, Capital Equipment
Mill Tonnes (Col.iv is MrdRm. 1912 Prices)

	Domestic Purchases of Crude Steel unadjusted (i)	Domestic Purchases of Crude Steel adjusted for indirect trade (ii)	Domestic Purchases of Cement (iii)	Domestic Purchases of Capital Equipment (iv)
1924	10.4	9.2	3.2	3.5
1925	10.4	8.8	2.9	3.7
1926	9.1	7.2	3.5	4.2
1927	14.7	12.8	3.2	5.1
1928	12.1	10.0	3.7	5.0
1929	14.4	11.8	5.7	4.8
1930	9.1	6.5	5.2	3.6

B. Quarterly Estimates of Domestic "Consumption" of Iron and Steel
Mill Tonnes Crude Steel Equivalent

	1925	1926	1927	1928	1929
1st Quarter	3.4	1.6	3.3	3.9	3.5
2nd Quarter	3.2	1.8	3.8	3.2	3.0
3rd Quarter	2.5	2.3	4.0	3.0	3.0
4th Quarter	2.0	2.9	4.1	2.3	2.9
Annual	11.1	8.6	15.2	12.4	12.4

C. Building Output and Maintenance (Residual Estimate from Gehrig)
MrdRm.

	Output	Maintenance
1926	5.6	0.5
1927	7.5	1.2
1928	8.5	1.7
1929	8.3	2.3
1930	6.5	1.1

SOURCES:
A. (i), (ii), (iii): Svennilson, Growth ... pp 276-9, 234-5.
(iv): Gehrig, Eine Zeitreihe ... p 35, deflated with price index therein.
B. IfK, Konj.Stat.Hdb. (1936) p 217.
C. Gehrig, p 46; see text p 13.

residual, Hoffmann, his estimates of investment in machinery and equipment as a residual *27.

'Supply side' indicators of investment activity are also published by Svennilson *28 and by the Institut für Konjunkturforschung *29. Both are reproduced in Table 2 p 244. Both of these construct estimates of output plus net imports of iron and steel, adjusted for indirect trade (ie in goods embodying iron and steel); the former also offers a similarly-constructed index of domestic cement consumption. The two iron/steel series agree quite well with each other, except that that of Svennilson suggests a recovery in 1929 not evident in the Inst.f.Konj.forsch. series. But even allowing for the lag in the activation of assets in balance sheets, both indicators seem to suggest an earlier 'turning point' in investment activity during 1928 than do the 'ownership' estimates.

Svennilson's series of domestic cement purchases would be harder to

*27 Since both Gehrig and Hoffmann implicitly accept the superiority of 'ownership' estimates, the validity of their respective 'supply side' series can be gauged by assessing the plausibility of the residual component estimates which their data imply. On this count, Gehrig's series is patently inferior. His residual estimate of investment in buildings, reproduced in Table 1C p 239, declines before his 'supply side' estimates of investment in machinery. Given relative lag structures, this seems unlikely. Moreover, to fit his residual estimates to available estimates of the rate of building construction, he has to assume an altogether implausible 'jump' in buildings repairs in 1929. See Table 2C above. By contrast, Hoffmann's residual estimates of investment in machinery show a sharper fall in 1929 than do his 'supply side' estimates of buildings investment, and can plausibly be related to data on domestic new machinery orders. See below p 247.

*28 Ingvar Svennilson, Growth and Stagnation in the European Economy pp 211-3, 227-30, 276-85.

*29 Konj.Stat.Hdb. (1936) p 217.

relate to any estimate of investment in buildings, or of the level of activity in the construction industry.

'Ownership' estimates are clearly superior to 'supply side' estimates. This view is confirmed by the practice of Hoffmann and Gehrig, both of whom rely on the former type for their aggregate estimates.

Postscript: current and constant prices. Only Hoffmann offers estimates of (net) fixed investment in 'Gewerbe' at constant (1913) prices. He deflates his estimates of the stock of machinery and equipment at purchase prices by the Stat.Reichsamt index of producer goods prices, his estimates of the stock of buildings at construction prices by the Stat.Reichsamt index of buildings costs *30. In view of the already mentioned uncertainty surrounding the capital stock estimates, and the considerable alteration in the price structure since 1913, so aggregative a method seems likely to introduce as many errors as it eliminates. In fact, the relevant prices changed only slowly during 1926-29. The index of producer goods prices was rather stable 1926-27, but rose fairly fast 1927-28, more slowly 1928-29. It is probable therefore that the current value estimates exaggerate fixed investment during 1928 relative to that of 1927; ie that they are biassed against the hypothesis of an early reduction in fixed investment activity in Gewerbe, which I wish to sustain. It seems pointless therefore to submit the data to elaborate deflation techniques.

8.2.2. Statistics of Investment Intentions

Happily, there are good data on investment intentions. For machinery, we have the index of new orders to the mechanical engineering industry,

*30 Hoffmann ... pp 231, 245.

Table 3 Investment Intentions

A. New Domestic Orders to Mechanical Engineering

	1925	1926	1927	1928	1929	1930
1st Quarter	119	61	101	111	92	71
2nd Quarter	100	61	116	102	96	61
3rd Quarter	91	76	138	97	87	55
4th Quarter	64	84	110	91	77	41
Annual	94	70	114	100	88	57
Annual						
Lagged 3 months	-	62	103	100	87	63
Lagged 4 months	-	61	98	100	87	64
Lagged 6 months	-	57	83	100	82	65
Investment Realisations: Equipment, Gewerbe	-	58	81	100	77	16

B.(i) Number of New Permits issued for Building: Private Sector (excl. Housing). c.90 cities for 1926-28; 96 cities 1929 Thousands

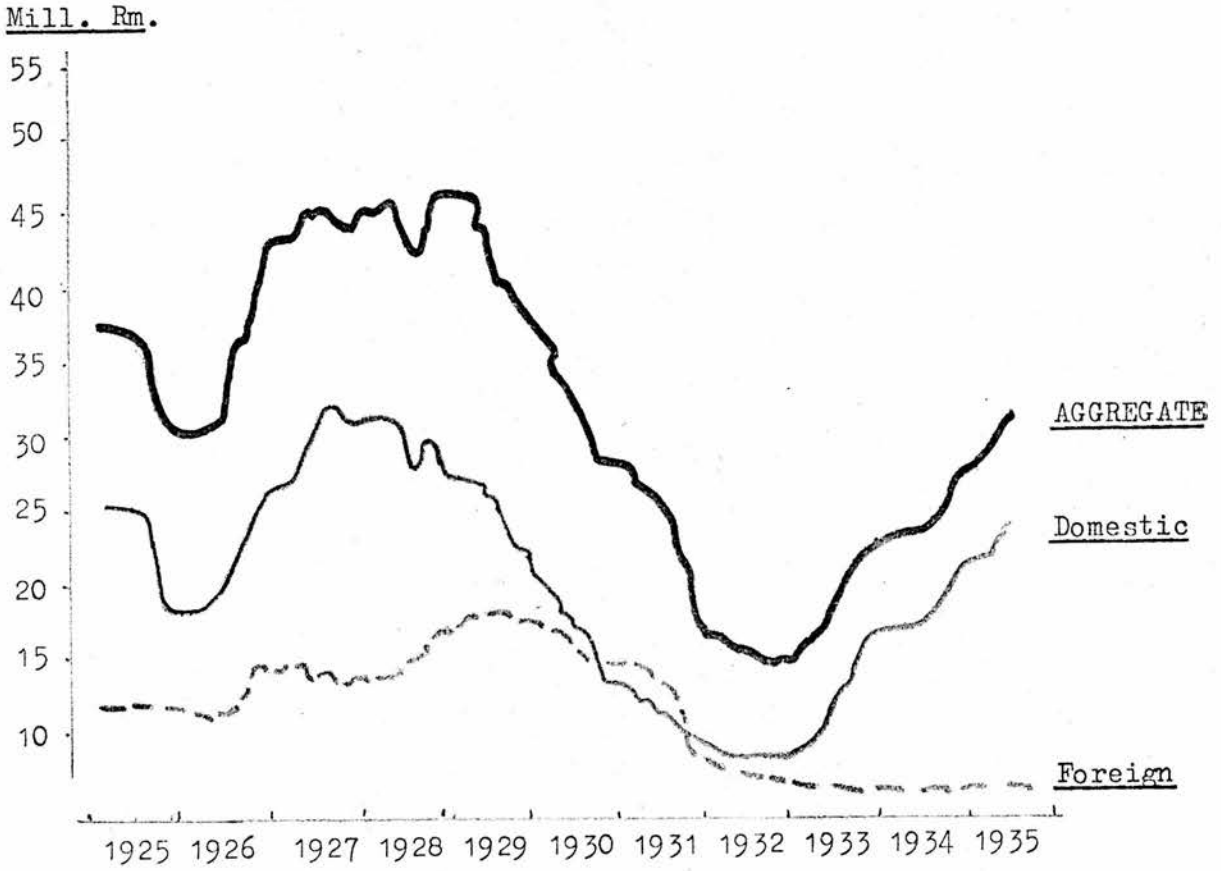
	1926	1927	1928	1929
1st Quarter	2.2	2.3	2.0	1.7
2nd Quarter	2.6	2.9	2.4	2.3
3rd Quarter	2.6	3.0	2.2	2.1
4th Quarter	2.6	2.9	2.1	2.1
Annual	10.0	11.1	8.7	8.2

B.(ii) Net Increase in Number of Private Sector Buildings (excl. Housing). c. 90 cities

	1926	1927	1928	1929
1st Quarter	1.5	1.3	1.1	1.2
2nd Quarter	1.3	1.1	1.4	1.3
3rd Quarter	1.2	1.1	1.5	1.5
4th Quarter	1.3	1.7	1.7	2.1
Annual	5.3	5.2	5.6	6.2

SOURCES: A: Konj.Stat.Hdb.(1936) p 228. (last line: Table 1B(vi) p 239.
B: Wi.u.St. 1928 p 90; 1929 p 86; 1930 p 129.

DIAGRAM 8/I New Orders to the Siemens-Schuckert Werke
Aggregate, Domestic and Foreign
(Twelve-monthly moving averages)



SOURCE: P.Czada op.cit. p 177 (Ultimate: Siemens Archives).

published by the German Machine Builders Association (VDMA). It distinguishes domestic from export orders, and also combines both into an aggregate index; it was based on reports from about 600 firms *31. Probably it refers to number of orders *32. On some simple assumptions, this index (reproduced on Table 3 overleaf) appears to reflect short term change in investment intentions rather well. This can be checked by lagging the index, and comparing it then with realised investment in machinery. Machinery orders evidently took on average between four and six months to complete *33. If one lags the quarterly estimates in Table 3A by three, four, and six months respectively, one gets rough estimates of gross machinery realisations. These are compared, on an annual basis, with Hoffmann's residual estimates of (albeit net) machinery investment in Gewerbe *34. See the same Table. It can be seen that the new orders data lagged six months agree remarkably closely with Hoffmann's, except in 1930, when the fact that the former is gross, the latter net, may be relevant.

*31 G Oberwinter, Konjunktur und Bilanz in der deutschen Maschinenindustrie p 140ff.

*32 Ibid. p 142. I infer that by 'volume ('Mengen-) index' he means 'numbers of orders'. He refers to a 'value' index, but I cannot trace it.

*33 Maschinenbau i(1929) January p W22, 'Ende des Jahres 1928'. From M Evans op.cit. pp 95-105, it seems that in the USA today current investment activity reflects decisions originally taken (on average) c.one year ago, subject to programme modifications decided three to six months ago. These lags represent an average for both buildings and machinery investment; hence the information probably corroborates that from Maschinenbau. Note too that pressure on the capacity of the investment goods industries was less in Germany.

*34 The major discrepancies of coverage are that the intentions data includes orders to agriculture, railways, the post office; Hoffmann excludes these.

Czada published a diagram of the inflow of foreign and domestic orders respectively to the Siemens-Schuckert Werke, reproduced in Diagram 8/I above. The decline in new domestic orders in this diagram appears about the middle of 1928, that is, a little later than the VDMA index. This doubtless reflects the fact that this company's primary domestic clients were the public electricity supply *34A.

Lastly, estimates of investment intentions and realisations with regard to industrial and commercial buildings can be read from the Stat. Reichsamt data on building plans (Bauvorhaben), permits issued (Bauerlaubnisse), construction starts (Baubeginne), and net increase (Reinzugang) in ninety cities *35. The series on permits issued, and net increase are reproduced in Table 3B p 247 . Hoffmann's estimates of buildings investment in Gewerbe depend on the latter series up to 1928 (spliced thereafter to an entire-Reich survey). Nevertheless, no clear parallelism is obvious between the series in Table 1B(ii) and (v) and 3B(i). The permits data represents a reduction in intentions from early 1928, but Hoffmann's realisation series is already lower for the year 1928 than for 1927. As already noted, Hoffmann's figure for 1928 is hard to account for.

8.2.3. Contemporary Perceptions of the Investment Recession

Much contemporary discussion is in fact comment upon the statistics just presented, but though not independent, it can cast light on the contemporary interpretation of them.

*34A See the discussion above pp 186 ff.

*35 Each of these series is denominated in numbers of buildings.

In general, earlier articles tend to rank the decline of textile output as more important than the decline in domestic sales of investment goods, though viewing the signs of this latter decline as a disquieting 'further stage' in the general recession *36. By the end of 1928 the investment recession is being assigned a much more prominent place *37. The evidence in Maschinenbau, the organ of the VDMA, relates to this body's new orders index, and notes the decline in domestic orders as early as the turn of 1927-28 *38, remarking the fact with increasing conviction as time progressed *39. The Vjh.Konj.forsch. repeats this analysis *40, and notes in addition evidence of a decline in domestic sales of iron and steel, which it attributes to the decline in railway investment *41, the decline in investment activity in iron/steel itself *42 and the general decline in industrial and commercial building *43.

The Deutsche Bergwerks Zeitung, usually regarded as the organ of Rhenish-Westphalian heavy industry, notes the decline of domestic iron and steel sales from February 1928 *44.

*36 Eg C Krämer, 'Die deutsche Wirtschaft um die Jahresmitte,' in Wd 13/2(1928) p 1218; Wk 7(1928) p 117, 'Decrescendo'.

*37 MdW 1928 pp 1979ff, 'Abklingende Konjunktur'.

*38 Maschinenbau 9(1928) p 128, 'Die Jahreswende 1927/8'.

*39 Maschinenbau 9(1928) p 688, 983 (Monthly reports June/Sept.)

*40 Vjh.Konj.forsch. 1927 H4 p 53; 1928 H1B p 14; 1928 H3B p 15.

*41 Vjh.Konj.forsch. 1928 H1B p 13.

*42 Vjh.Konj.forsch. 1928 H3B p 12.

*43 Vjh.Konj.forsch. 1929 H2B p 14.

*44 DBZ 29.2.28 p 1, 'Nachlassen der Eisenkonjunktur'.

The reports of companies in investment goods industries also furnish confirmatory evidence of decline in domestic sales to the private sector in 1928, most noticeable in electrical engineering *45, but also in iron and steel firms dependent on the construction industry *46, and a large mechanical engineering firm *47.

Evidence of domestic investment recession is of course much more plentiful in 1929, but that is not relevant here.

Finally, Keiser and Benning's comment on their own work may be cited. They explain the fact that the level of fixed investment was higher in 1928 than in 1927 by the fact of the 'spilling over' of activity on projects begun later in 1927, and by the lag in the activation of assets in balance sheets already noted *48. Clearly they felt that the fact that their work revealed that fixed investment reached a peak as late as 1928 required explanation; it was not possible to explain it by reference to a surge of new projects in 1928.

8.2.4. Conclusion: the Pattern of Fixed Investment Activity in 'Gewerbe'

In the period under review, there were two upper turning points in fixed investment activity (1925 and 1928) and one lower (1926). The 1925 upper turning point can probably be dated, as far as intentions are concerned, in the first quarter of the year (Table 3A p 247);

*45 Siemens und Halske, Annual Report 1927/8; Accumulatoren Fabrik, Report 1928; Felten und Guilleaume, Report 1928.

*46 Buderus Eisenwerke, Annual Report 1928.

*47 Demag AG, Annual Report 1928.

*48 Vjh.Konj.forsch. 1930 H3A pp 73ff. I infer from verbal similarities to Kapitalbildung und Investitionen (loc.cit. *16 above) that this was written by Keiser and Benning.

as far as output of investment goods is concerned, just before mid-year (Table 2B p 244); hence as far as realisations are concerned, probably in the third or fourth quarters of 1925. By a similar process, the lower turning point of 1926 seems to span the middle of that year. As far as intentions are concerned, the second upper turning point in Gewerbe seems to have occurred in the fourth quarter of 1927; as far as output of investment goods is concerned, early in 1928; in respect of realisations, possibly at mid-year for machinery, somewhat later for buildings. Thus the upper turning point either precedes or at latest, coincides with the turning point in inventory investment, and clearly precedes the 'closure' of the U.S. bond market at mid-year, usually associated with the share speculation there *49. Why?

8.3. The Fixed Capital Stock in 'Gewerbe': its Utilisation

8.3.1. The capital stock adjustment model directs our attention first of all to questions of utilisation of the actual stock. This question has two aspects. Firstly, the relationship between the capacity output of the actual stock, and its expected actual output. This question is treated of in this section. Secondly, the technical efficiency of the actual stock; obsolescence may induce 'net' investment even in the presence of substantial excess capacity. This question is considered in section 8.4.

*49 C P Kindleberger, The World in Depression, pp 70ff.

8.3.2. Statistical Measures of the Utilisation of the Capital Stock

Two measures of the degree of utilisation of the fixed capital stock have been published *50. Both are reviewed in Appendix V p 423 ff. Krengel's methodology is unsatisfactory, since it depends on the assumption of a constant long term capital-output ratio. Mester's index could be adopted directly from 1928, on certain assumptions about the capital-labour ratio; it is based on Inst.f.Konj.forsch. reporting of actual employment as a percentage of capacity employment in the several industries (Arbeiterberichterstattung) *50A. His method of extrapolating this series through 1924-27 is unsatisfactory however. A revision is proposed in Appendix V. Since the ratio of the utilised fixed capital stock to the employed labour force is ex hypothesi unknown for 1924-27, I propose three alternative backward extrapolations of the 1928 ratio:

A. that the capital-labour ratio was constant 1924-28,
B. that the capital-labour ratio increased at ½% p.a. 1924-28,
C. that the capital-labour ratio increased at 3% p.a. 1924-28.

The estimates thus derived are reproduced in Table 4 overleaf, in two forms, using two different capital stock series: the 'net' series of Hoffmann, covering 'Gewerbe'; and the 'gross' series of Krengel, covering only mining and manufacturing. It should be noted that both

*50 A F Mester, 'Eine Zeitreihe der Ausnutzung des Sachkapitalbestandes', and R Krengel, Anlagevermögen ... pp 86-89.

*50A See description in Vjh.Konj.forsch. 1930 H1A pp 44-6. 3500 firms, and c.3 million workers were covered.

Table 4 Revised Estimates of the Utilisation of the Fixed Capital Stock

1. "Gewerbe": Hoffmann Fixed Capital Stock Estimates (Buildings and Equipment) %

	A	B	C
1924	85.5	84.3	76.5
1925	90.2	88.8	82.5
1926	81.4	80.6	76.6
1927	89.9	89.5	87.2
1928		89.6	
1929		88.0	
1930		76.5	

2. Manufacturing and Mining: Krengel Fixed Capital Stock Estimates %

	A	B	C
1925	91.4	89.9	83.6
1926	79.8	79.1	75.2
1927	89.9	89.5	87.4
1928		89.6	
1929		88.0	
1930		76.5	

SOURCES: 1. Appendix V Table C(i), F (p 437)
2. Appendix V Table C(ii), F (p (437)

KEY: A The capital-labour ratio for 1928 applied throughout 1924-28.
B The capital-labour ratio rose at ½% p.a. 1924-28.
C The capital-labour ratio rose at 3% p.a. 1924-28.

sets of estimates as presented here, probably conceal an upward bias *51. Good grounds exist for supposing that the capital-stock ratio did rise in 1924-28 *52. But even if it were constant, then the fact of chronic excess capacity on average, is evident. This would be consistent with evidence of endemically low levels of fixed investment activity in 'Gewerbe'. Nevertheless, there is little sign of a reduction in utilisation rates between 1927 and 1929 in aggregate, such as might explain the investment recession.

8.3.3. Other Evidence about Capital Stock Utilisation

I consider first the specific evidence for individual industries *53. It is doubtless true to say, that for most of 1924-29 the capital stock in the so-called 'new industries' would be fully utilised, ie in leading firms in electrical engineering, chemicals, rayon, and vehicles. I specify the leading firms, because most of these industries also contained a number of firms on the wane *54. Some examples of excess plant may be cited:

*51 The 1928-30 estimates are derived directly from the Inst.f.Konj. forsch. 'jobs reporting'. But they assume that a reported actual employment rate of 80% represents in fact 'normal' full capacity employment. Every figure in the Table is therefore the original reported percentage multiplied by 5/4. The extrapolated 1924-27 figures derive their 'level' from this assumption.

*52 See Appendix V pp 431-5 .

*53 Substantiation that there was general excess capacity in the period under review can be found in eg J Hirsch, 'Wandlungen ...' pp 201ff. D Warriner, Combines and Rationalisation in Germany, pp 64ff.

*54 W Hagemann op.cit. pp 102-7.

Electrical Engineering: Accumulatoren Fabrik *55; the firms in the cable industry syndicate *56. (Bergmann's annual reports 1924-29 hardly convey the impression of high pressure of activity either *57). Chemicals: Anglo-Continentale Guano. This company reports a shut-down of plant even in 1927. A.G. für Chemische Produkte. The reports of neither J.D. Riedel-E. de Haën nor of Rütgerswerke A.G. convey the impression of a high level of activity *58. The Enquete Ausschuss reports excess capacity in the nitrogen fertilisers branch *59. There seems no evidence for either electrical engineering or chemicals that the degree of utilisation deteriorated 1927-29.

Rayon: Up to 1928 there is no evidence of excess capacity for any firm. From 1928 reports of excess capacity multiply, doubtless due to over-extension of plant in an industry where gestation periods are long *60.

Vehicles: Before 1927, excess capacity could perhaps be inferred for one or two ailing firms *61, and also perhaps for the entire industry *62. However after 1927 evidence multiplies of serious excess

*55 Annual Reports 1926-29.

*56 Kölnische Zeitung 18/2/29, "Zersplitterung in der Kabelindustrie".

*57 Bergmanns ElektrizitÄts A.G. Annual Reports 1926-29.

*58 See the annual reports of these firms 1925-29.

*59 E.A. 111/6 Die deutsche Chemische Industrie, p 103.

*60 Vjh.Konj.forsch. 1927 H4 p 58; 1929 H2B pp 24-5; Spinner und Weber 1929, N4 p 34, 'Die Konkurrenz in der Weltkunstseidenmarkt'; DBZ 26/2/29 p 1 "Die Konsolidation der deutschen Kunstseiden-industrie".

*61 National Automobil Gesellschaft (NAG), Annual Reports 1924-29.

*62 Wd 13/2 (1928), p 1376, "Die deutsche Kraftfahrzeugindustrie".

capacity, attributable to the completion of several conversions to mass production *63. These scraps of evidence are not intended to prove general excess capacity in the "new industries" but only that the pressure of demand cannot have been all that high (except in rayon) else even the weaker firms would have probably been fully employed. Outside of the "new industries" the evidence of excess capacity can be roughly summarised as follows.

Hard Coal: The major coalfields were strictly syndicated, so that normal market processes were distorted. In any case coalfields are always shutting down old workings and opening new ones; the level of demand only affects the margin of operation. The Ruhr field did have an endemic tendency to excess production as measured by coal stocks at the pit head *64, and the general conclusion of both the majority and minority reports of a famous commission into the profitability of the industry (the "Schmalenbach Gutachten") was that it was barely if at all profitable *65. In a free market these factors would depress investment intentions; however it must be recalled that the motivation for investment in this industry lay in the complexities of the Syndicate organisation and of its relationship with the iron and steel industry. Due to increasing competition from British coal in the later 1920s, the average price (received by all members) grew increasingly

*63 Wd 14/1(1929) p 1016, "Die deutsche Kraftfahrzeugindustrie im Jahre 1928"; DBZ 12/2/29 p , "Überfremdung der Opelwerke".

*64 See the data on coal stocks at the pithead (Haldenbestände) in IFK, Konj-Stat.Hdb. (1936) p 208.

*65 (Schmalenbach) Gutachten über die gegenwärtige Lage ... E.A. 111/1 Die Deutsche Kohlenwirtschaft p 139ff.

unfavourable *66. In the Coking industry cartel arrangements brought about greatly excessive capacity in the opinions of contemporaries *67. The fact that the industry was also in the throes of radical technical transformation (from scattered, to central coking plants) is an additional explanation. It seems plausible that some level of excess capacity was bound to deter further investment.

Lignite was rather a new industry; reserves were being increasingly exploited by the chemical industry and the power stations. Excess capacity seems unlikely here *68.

Iron and Steel. The degree of capacity utilisation in this industry in the late 1920s was the subject of lively controversy, unleashed by the (oblique) allegation in the relevant "Enquete-Ausschuss" report, of over-extension of plant *69. This was vigorously repudiated by representatives of the industry *70, and combatted on both sides in the press *71. The controversy generated more heat than light, mainly because of failure to define an adequate concept of "capacity".

*66 Vjh.Konj.forsch 1927 H2 p 38; 1928 H1B p 10: The seveee winter of 1928/9 temporarily reversed this; cf ibid 1929 H3 p 12; See also Jahresberichte der ... Industrie und Handelskammern des Ruhrbezirks 1928 pp 107-9, 1929 p61ff.

*67 E-A 111/1 Die deutsche Kohlenwirtschaft p 28ff; E Welter, Wachstum ... p 25.

*68 cf. the output statistics in Hoffmann ... p 342, Col 2.

*69 E-A 111/3, Die deutsche Eisenerzeugende Industrie, pp 18-19 cf. R.A. Brady, The Rationalisation Movement in German Industry p 125ff.

*70 The industry's record of its response is to be found in BA R13/I Vols 336, 337; See also Stahl und Eisen 1930 p 1747, "Die Leistungsfähigkeit der deutschen Stahlindustrie" (article by J W Reichert).

*71 cf the controversy in Wd 16/1 (1931): articles by P Berkenkopf, pp 93ff, 533ff; by O Veit, pp 220ff.

However I have discovered one notable thesis which emerged from the controversy - by J Strohe *72.

Strohe judges that in the period under consideration, crude steel or rolling mill capacity defines capacity for the industry as a whole *73. Since blast furnace capacity was always excessive, this seems plausible *74. He estimates peak capacity output by aggregating the highest single monthly output of crude steel in four separate regions during (i) 1925-28 and (ii) 1929-30 *75. This task is complicated by quality differences etc, but he notes that his methods are comparable to those of the controversialists after removal of biasses in their methods.

He then expresses actual annual outputs of crude steel 1925-28 as a percentage of estimated capacity output 1925-28; likewise for actual annual output 1929-30. His results are shown in Table 5 below.

Table 5 Degree of Utilisation of Crude Steel Capacity

	Estimated Capacity Output. Mill tonnes	Actual Annual Output. Mill tonnes	% Utilisation of Capacity
1925	19	12.2	69
1926	19	12.3	69
1927	19	16.3	92
1928	19	14.5	82
1929	23	16.2	81
1930	23	13.5	57

SOURCE: J Strohe op.cit. p 53.

*72 J Strohe, Der Streit um den Enqueteberich t über die Eisenschaffende Industrie.

*73 Ibid, p 44.

*74 See St.Jb.f.d.Dt.R. 1924/5, p 96; 1928 p 114; 1931 p 99.

*75 Ibid. p 54.

These estimates might be expected to understate the true degree of utilisation, since peak monthly output could be well in excess of optimal long-term output *76. Comparison of Strohe's data with the unadjusted IfK "jobs capacity index" for 1928-29 tends to confirm this point *77.

Moreover the method of calculation of the 1925-29 estimates means that the earlier estimates are biassed downwards relative to the later. However the degree of bias would have to be truly great for there actually to have been full utilisation in the crude steel section in any year but 1927.

Supplementary evidence is provided by evidence available in the records of the Crude Steel Cartel and in contemporary newspapers as to the length of deliveries delays, or length of period of employment guaranteed by the existing backlog of orders in different branches of iron and steel *78. There are practically no periods when delivery delays exceeded three months in any branch of the industry outside of the summer or autumn of 1927, except in the case of Railway structural material. These figures can be related to a statement by J W Reichert in his 1927 report to the iron and steel industrialists' association (VDESI), of which he was executive director *79. The U.S. iron and

*76 cf. A Phillips op.cit. pp 282, 290.

*77 IfK, Konj.stat.Hdb. (1936) p 19.

*78 This information, gleaned from the Cartel's "Reports on the State of the Market" (BA R13 I/45) and from the files of the Deutsche Bergwerks Zeitung and the Industrie- und Handelszeitung, has not been reproduced for reasons of space.

*79 Verein Deutscher Eisen und Stahl Industrieller (VDESI) Bericht über die Mitgliederversammlung 1927 p 26.

steel industry, he said, regarded as normal an order book securing employment for the next two months. Such a state of affairs with us for a few months of 1927 has been regarded as boom conditions (Hochkonjunktur). This was a statement for private circulation only. It hardly suggests "overheating" in the industry even in the latter half of 1927.

Thus it may be concluded about the iron and steel industry, that except in the last half of 1927 not even optimal capacity utilisation was achieved, secondly that there was significant decline in the degree of utilisation 1927-28 *80.

Despite this excess capacity, individual firms may have wished to increase their capacity even apart from the question of technical progress.

Thus Krupps built a blast furnace complex adjacent to their foundry in Essen, to improve its efficiency *81. Mannesmann also built a blast furnace complex to free itself from dependence on external supplies *82. Berkenkopf alleges these did not significantly increase total (pig iron) capacity, but his witness is biassed *83. In this industry too, there must have come a point where excess capacity inhibited further investment.

Mechanical Engineering. The industry's association (VDMA) kept its

*80 cf. also Berliner Börsen Zeitung 5/2/29 p , "Die Wirtschaftsziele der Stahlindustrie".

*81 BA R43/I Vol 656; cf F Krupp AG Annual Report 1928/9 (as abstracted in Stahl und Eisen 1929 p 93).

*82 Stahl und Eisen 1930 p 753, "Die Neuanlagen der Mannesmannröhrenwerke ..." In retaliation, Krupp threatened to enlarge its tubes capacity: DV III 17/5/29 p 1098.

*83 Berkenkopf in Wd 16 (1931) p 93. Article cited *71.

own "jobs reporting index" similar to that subsequently adopted by the IFK. (For definition, see above p 254).

Table 6 Mechanical Engineering Jobs Capacity Index

	1913	1925	1926	1927	1928	1929
Annual	100	58	51	64	72	74
1st Quarter		75	61	62	78	
2nd Quarter		77	58	69	79	
3rd Quarter		75	58	73	79	
4th Quarter		68	59	74	73	

SOURCES: Annual: Maschinenbau (1928), pp 604-5; (1.8.29) pp W170-172.
Quarterly: Albert Hesse: Die wirtschaftliche Lage ... p 15 (ultimate:VDMA)

Why Hesse's quarterly data is systematically higher than the Maschinenbau annual data is not clear; both are allegedly VDMA statistics. For my purposes however both yield the same conclusions.

a) The general level of utilisation of the capital stock appears to have been extraordinarily low. This is true even if we allow that this index expresses a percentage of maximum rather than optimum utilisation, and that the capital-labour ratio of the stock in use exceeds that of the idle stock. The fact that the VDMA themselves "guess" the 1913 level at 100% shows that they thought the post-stabilisation level of utilisation low.

That the average level of utilisation in an investment goods industry is low perhaps is not surprising; that peak utilisation is also low, is. There is plenty evidence that contemporaries regarded the continuous

excess capacity as a serous problem *84.

b) According to this data the degree of utilisation actually increased over the period, doubtless owing to the export boom of the last years of the decade. Particular sections of mechanical engineering had differing experiences. Locomotive and waggon building were appallingly under-utilised *85. The level of employment in the large textile machinery industry was only fair during 1927-29 *86, though individual sections of it, like machinery for the knitted goods industries did very well *87. The paper-making machinery section was also fully employed *88, as was that supplying equipment to iron, steel and coal-mining during 1927/8, but sales from this section seem to have fallen steeply by mid-1928 *89. It is clear that the level of utilisation in shipbuilding was disastrously low *90. An index of post-war output itself makes that clear.

*84 eg Maschinenbau 8 (18.7.29) p W157, "Das Missverhältnis zwischen Produktion und Produktionskapazität in der Maschinenindustrie"; G Oberwinter, Konjunktur und Bilanz in der deutschen Maschinenindustrie p 46.

*85 Vjh.Konj.forsch. 1927 H4 pp 66-7; 1928 H4B p 28; Commerce Reports 13.5.29 p 430, "Problems of the German locomotive Industry;" Maschinenbau 8(18.4.29) pp W85ff, "Der Lokomotivebedarf der deutschen Reichsbahngesellschaft".

*86 Maschinenbau 9 (18.12.30) pp W272ff, "Die deutsche Textilmaschinenindustrie"; Spinner und Weber 1928 Nr1, p 34, "Aus der Wuppertaler Textilmaschinenindustrie".

*87 F Grunbaum, Die Welttextilkrise pp 47-9.

*88 Inferred from Maschinenbau 9 (3.4.30) p W83, "Die Lage der Papierindustrie"; cf. E-A I/5/10, Die deutsche Zellstoff ... industrie p 292.

*89 Vjh.Konj.forsch. 1927 H3 p 44; 1928 H1B p 14.

*90 DBZ 11/12/27 p 11, "Lage und Aussichten im Schiffbau"; Wd 13/2 (1928) p 1502. Die Krisis im deutschen Schiffbau. W Hagemann op.cit. p 129.

Table 7 Annual Output of Ships: BRT (000)

1919	-	1923	716	1927	786
1920	1606	1924	638	1928	601
1921	1726	1925	544	1929	644
1922	1257	1926	631		

SOURCE: St.Jb.f.d.Dt.R. 1928 p 171, 1930 p 174: sea-going ships completed during year, and under construction at end of year.

But at least the degree of utilisation was not falling 1927-29. To sum up therefore for the engineering trades in general. The level of utilisation of the capital stock was very low throughout the period for all but a few firms in electrical engineering and vehicles. Nevertheless, outside of vehicles and certain sections of machine building, the situation does not appear to have deteriorated during 1927-29.

Textiles. The evidence about the utilisation of the capital stock is not so plentiful for this sector. Statistics can be assembled however for cotton-spinning and weaving.

The following tables indicate full utilisation of the stock in 1927 and under-utilisation at other times. They confirm the view that the 1928/9 recession was severer in weaving than spinning *91.

The situation in sections of the wool industry seems to have been somewhat better, as a rule, notably in the rapidly developing knitted goods section *92, and in the "Kammgarn" branch *93.

*91 Wd 14/2 (1929) p 1719, "Die deutsche Baumwollwebereien im Jahre 1928".

*92 E Kupczyk, "Die deutsche Wirkerei und Strickerei seit 1927", in Wd 14/2 (1929) p 1767.

*93 G Plum, "Die deutsche Kammgarnspinnereien", in Wd 14/1 (1929) p 139, cf Vjh.Konj.forsch.1927 H4 p 58; 1929 H2B p 23.

Table 8 Cotton: Utilisation of the Capital Stock

(i) Spinning: % of available Spindles in Operation
Selected Months 1926-29

	1926	1927	1928	1929
February	-	95	-	-
May	-	97	-	-
June	-	-	-	86
October	85	97	91	-

SOURCE: Vjh.Konj.forsch. Various issues 1926-29.

(ii) Weaving: % of available looms in Operation
Quarterly Data 1925-29

	1925	1926	1927	1928	1929
1st Quarter	85	86	89	93	71
2nd Quarter	86	76	93	90	65
3rd Quarter	89	74	94	87	66
4th Quarter	89	85	93	86	72
Year Average	87	80	92	89	69

SOURCE: Ifk: Konj.Stat.Hdb. (1936) p 289.

In Linen and coarse fibres excess capacity had reached crisis proportions *94. When contemporaries viewed the textile sector as a whole, they perceived an endemic excess capacity problem *95. (Rayon is of course an exception (up to 1928) as shown above p 257 .) In 1928 the fortunes of all sections of the textile industry deteriorated

*94 Vjh.Konj.forsch.1928 H2B p 19; Wd 13/2 (1928), "Die Ubergangskrise der Textilindustrie" especially p 1300.

*95 H Frankfurther, "Die Übergangskrise der deutschen Textilindustrie" in Wd.13/2 (1928)p 1299. Spinner und Weber 1926 Nr. 17 p 25, "Die Textilarbeiter gegen die Textilindustrie"; J W Angell, The Recovery of Germany ... pp 168-70.

even of the most successful, like knitted goods and rayon *96.

Other Manufacturing Industries. For the rest of manufacturing, information is much scantier.

Many of the remaining branches are populated by small firms with a relatively small proportion of fixed capital assets: for example, building, saw-milling and wood-working, iron and steel wares, chocolate manufacture *97. In such branches "excess capacity" is hardly an applicable concept: a potential excess of supply over demand would manifest itself in unprofitable competitive conditions, bankruptcy, etc. Conditions differed greatly between these small-scale branches. Building appears to have been at least reasonably prosperous throughout the period, doubtless as a consequence of the sustained housebuilding boom *98. Saw-milling and wood-working, prosperous 1926/7, but depressed 1928/9 *99. The relevant "Enquete Ausschuss" reports assets that the inflation had left the small iron and steel wares branches with endemic excess capacity which manifested itself in a compulsion to export at unprofitable prices *100.

*96 E Kupczyk, article cited *92 p 1768.

*97 "Die Krise in der Schokoladenindustrie" Wd 13/2 (1928) p 1419.

*98 eg Vjh.Konj.forsch. 1927 H2 p 54; 1928 H3B p 24-5; 1929 H3B p 27. Zement XIX (1930) p 253ff, "Die Bautätigkeit im Jahre 1929"; XVIII (1929) p 362, "Die Bautätigkeit im Jahre 1928".

*99 Vjh.Konj.forsch. 1926 H4 pp 65-7; 1927 H3 pp 55-6; 1928 H2B pp 29-30, 1929 H2B pp 30-31; Jahresberichte der Arbeitsgemeinschaft der Industrie und Handelskammern des Ruhrbezirks, Das Wirtschaftsjahr 1926 pp 284-5, 1927 pp 198-9, 1929 p 151-2 (articles: "Die Möbelindustrie").

*100 E-A 1/5/11 Die Deutsche Eisen- und Stahlwaren Industrie, p 350.

Excess capacity per se was a much noted feature of the cement industry *101 attributable in large measure to cartel conditions. These meant that the largest firms were still extending capacity somewhat in 1928 despite (allegedly) the fact that on average only 60% of the available plant was in use *102. I lack information on other branches of building materials.

Paper-making. The evidence is not quite clear-cut, but in general this branch seems to have been relatively little troubled by excess capacity in these years. If there was some, it was probably obsolete plant *103. The degree of utilisation evidently did not fall until late 1929 *104.

Glass and Ceramics. The state of the glass industry was dominated by the technological transformation of the plate glass section. The evidence suggests that this resulted in considerable excess capacity in 1928/9, evidently much greater than any previously experienced, since it broke up the cartel *105. Excess capacity is said to have characterised the porcelain industry since the stabilisation (and evidently this was still so in 1929); this prompted mergers in the industry *106.

*101 I Svennilson op.cit.pp 159-60, R Liefmann op.cit. p 71.

*102 G Plum, "Die deutsche Zementindustrie im Jahre 1928" in Wd 14/1 (1929) p 850.

*103 DBZ 16/12/27 p 8, "Die deutsche Papierindustrie im Jahre 1926/7"; Maschinenbau 9 (3.4.30) p W83, "Die Lage der Papierindustrie" E-A 1/5/10 op.cit. p 135ff, 292.

*104 Der Papier Fabrikant XXVII (1930) p 902, "Die deutsche Papierindustrie."

*105 Sprechsaal 1927 pp 634-6, "Die deutsche Glasindustrie im Jahre 1926", 1928 pp 647ff, "Die deutsche Glasindustrie im Jahre 1927"; 1929 p 549, "Die deutsche Glasindustrie im Jahre 1928"; 1930 p 9, "Die deutsche Glasindustrie im Jahre 1929".

*106 Sprechsaal 1928 pp 12-13, "Die Lage der Porzellanindustrie im Jahre 1927; 1929 pp 98-100, "Die Porzellanindustrie nach dem Konzentration; 1929 p 277, "Probleme der Porzellanindustrie".

I have no information about other branches of ceramics.

Leather. Activity in this industry was very cyclical. If comments on the level of employment can be used as a rough guide, at least in 1927, actual output was near capacity levels. By 1928 considerable unemployment had emerged, and there was some attempt to restrict output *107.

Shoes: This industry suffered throughout the period from low price Czechoslovakian competition. In September 1928 capacity utilisation was said to be just over 50% *108. By 1929 however technical progress was enabling the industry to compete more successfully *109.

Food, Drink, Tobacco. Probably excess capacity was not as prevalent in this branch. Brewing, for example, seems to have been fairly prosperous throughout the period *110. However flour-milling seems to have been beset by excess capacity and lack of profitability *111.

Trade, Commerce, etc. I have no information on capital stock utilisation in this section. Presumably it was higher and more uniform than in mining and manufacturing.

8.3.4. Utilisation of the Fixed Capital Stock: Conclusion

Statistical measures and contemporary comment combine to testify to significant excess capacity in German industry throughout 1924-29. Aggregate statistical measures indicate no deterioration of this in

*107 Vjh.Konj.forsch. 1927 H2 p 52; H4 p 60: 1929 H1B p 24; H2b p 25.

*108 Vjh.Konj.forsch. 1927 H2 pp 53-4; 1928 H3B p 22.

*109 Vjh.Konj.forsch. 1929 H3B pp 25-6.

*110 DBZ 22/2/28, "Das Braujahr 1926/7"; 27/1/29 p 11, "Das Braujahr 1927/8".

*111 Wd 13/2 (1928) p 1508, "Bilanzanspannung in der Mühlenindustrie" Wk 7(1928) p 199, "Die Konzentration in der Mühlenindustrie".

1927-29; comment and particular statistics suggest deterioration in certain sectors, notably heavy industry, vehicles, textiles, shoes and glass. The aggregate index is not necessarily the most relevant. About 40% of the decline of industrial fixed investment between 1928 and 1929 occurred in heavy industry; a further 20% in textiles *112. By contrast, in certain branches where utilisation improved in 1928-29, eg mechanical engineering, the absolute level of utilisation remained so low as to render any investment-inducing effects of that improvement very small.

8.4. The Fixed Capital Stock: its 'Quality'

8.4.1. If, for example, the capital stock at the start of the upswing in 1926 was perceived to be, on average, obsolete, a 'modernisation' boom could have been the propulsive force of the upswing. The investigation of this hypothesis is necessarily less precise than that of the relationship between capacity output and actual output. Two methods will be employed:

i) What was the rate of fixed investment in 1919-25? The faster this rate, the 'newer' on average the 1926 capital stock, hence the less the likelihood of its being obsolete. But this statement is subject to the qualification: many contemporaries believed that the investment activity of the inflation period was of inferior quality.

*112 Moreover, the investment activity of the former branch was disproportionately large, relative to its share of industrial net value added. See Table 14 p 298 below.

ii) What was the observed rate of technical change during the fixed investment boom of 1926-8?

8.4.2. To deal with the former question first. That contrary views have been expressed about the rate and the quality of investment activity during the inflation is well known *113. Evidence is, and probably will remain, inconclusive. A number of 'supply-side' indicators of gross investment activity in the economy as a whole are assembled in Table 9 below. There is some evidence that investment in agriculture was at quite a high level *114. Capital expenditure by central government and related agencies seems to have been fairly high *15, but that by local authorities (which normally undertook the bulk of governmental investment) appears to have been somewhat restricted by lack of finance *116. Housebuilding was at a lower level than after the stabilisation *117.

Thus, if we suppose that in aggregate, public sector gross capital formation was about as great a proportion of total fixed capital formation before the stabilisation as after, and that a higher proportion

*113 C Bresciani-Turroni, The Economics of Inflation, pp 201ff, 411ff, argues the paucity, and especially the poor quality of the investment. So too G Clausing op.cit. p 49; C T Schmidt, German Business Cycles, p 93. K Laursen and J Pedersen, The German Inflation pp 94-7 present the 'optimistic' view.

*114 FZ as quoted in Bresciani Turroni op.cit. p 202.

*115 Laursen and Pedersen op.cit. p 94; cf on railways pp 174 ff above.

*116 See pp 102ff above.

*117 See Table 11 p 194 .

Table 9 Some "Supply Side" Indicators of Fixed Investment in the Inflation Mill.Tonnes (unless otherwise specified)

	A. Apparent Consumption of Crude Steel		B. Apparent Consumption of Cement
	A1	A2	
	not corrected for indirect trade	corrected	
1913	12.1	-	5.9
1920)	(7.8)	-	2.2
1921)	(7.8)	-	2.9
1922	11.5	9.9	4.5
1923	7.5	6.5	3.2
1924/6	10.0	7.7	4.7
1927/9	13.8	11.6	6.5

C. Estimate of Domestic Purchases of Machinery

	C1	C2	C3	C4
	Domestic Sales per Employee Weight (Index)	Number of Employees 000s	Estimate of Domestic Purchases (Volume) Rm mill	Value of Domestic Purchases Rm mill
1921	0.75	1462	2740	-
1922	0.75	1654	3050	-
1924	0.64	1411	-	2310
1925	0.79	-	-	2600
1926	-	-	-	2080
1927/9	-	-	-	3240

D. Subsidiary Table to A.

	D1	D2	Rolling Mill Products	
	Output of Crude Steel	Output of Rolling Mill Products	D3 Exports	D4 Imports
1920	8.5	7.0	1.1	0.1
1921	10.0	8.5	1.5	0.4
1922	11.7	10.3	1.5	1.2

SOURCES for Table

A + B I Svennilson, Growth and Stagnation ... pp 276-9, 284-5 except col.A1 years 1920/21: see note A(ii) below.

C1 Maschinenbau, 5 (1926) p 858.

C2 Stat.Jb.f.d.Dt.R. 1923 p 74 (Order VII)

C3 See note C below.

C4 G Gehrig, Eine Zeitreihe ... p 38; Cols. 3+4+6-5.

D1 I Svennilson, Growth and Stagnation ... p 262.

D2 Stat.Jb.f.d.DtR. 1924/5 p 98: "Walzwerkerzeugnisse".

D3 + D4 Stat.Jb.f.d.Dt.R. 1923 pp 165-9; the following categories: Walzen aus nicht schmiedbarem Gusse; Träger aus schmiedbarem Eisen; Formeisen, Stabeisen, Bandeisen etc; all tubes (Röhren); all sheets (Bleche); all wire (Draht); Eisenbahnschienen, - schwellen, - laschen und -unterlagen, -achsen etc.

NOTES to Table

A(i) 1913 refers to inter-war territory.

A(ii) The estimate in col. A2 for years 1920/21 was obtained thus. I could not find data on foreign trade in crude steel, so used production and foreign trade in rolling mill products as a proxy (the former standardised to 1922 area, the latter current area). A comparison of D1 and D2 indicates the adequacy of the proxy. By the sum D2+D4-D3 I formed estimates of domestic consumptinn of rolling mill products and spliced these to Svennilson's estimates of domestic consumption of crude steel (col.A1) at 1922. This gave the desired estimates for 1920/21 which were averaged, to avoid a spurious impressinn of accuracy.

B See note A(i)

C To obtain the estimates of domestic purchases of machinery in col.C3, col.C1 was multiplied by col.C2 and the result spliced to col. C4 at 1924. This procedure ignores (i) imports of machinery. But even after 1924 these never exceed 5% of domestic output (cf Gehrig loc.cit.); (ii) price change 1924-29. Prices were, in fact, approximately constant. The 1923 estimate is omitted for lack of employment data.
According to Gehrig, the ratio of domestic output in 1924 to domestic output 1925-29 is 72%. His data source is VDMA/IfK. According to other VDMA sources the ratio is 65%. If this other data were more accurate, col.C3 would be a slight overestimate relative to col.C4. I assume however that Gehrig's revealed preference indicates the more accurate estimate.

of fixed capital formation in agriculture offsets a lower proportion in housebuilding, we may not be wide of the mark in assuming that gross capital expenditure in 'Gewerbe' formed a similar proportion of the total in both periods. On this assumption the estimates in Table 9 provide a benchmark on which to relate the fixed investment in Gewerbe during the inflation period, to that of 1924-29.

According to columns A1 and A2, domestic output of iron and steel in 1920-22 was, on average, probably a little less than that of 1924-26; of cement (column B) appreciably less; but domestic machinery orders (column C) appreciably above those of 1924-26 *118. Remembering the low levels of activity in 1919 and 1923, it appears from Table 10 that

Table 10 Gross Fixed Capital Formation in the USA and UK 1919-29
Constant Prices (USA = Mrd.1947$; UK = Mill.1938 £)

	1919	1920	1921	1922	1923	1924-6*	1927-9*
USA (macro)	2.1	2.7	1.3	1.6	2.1	2.0	2.4
UK (Macro)	172	284	326	300	308	389	447
(Mining + Mfg.)	72	83	98	81	76	82	83

* Annual Averages

NOTES: Macro: Estimates for entire economy.
Mfg.: Manufacturing.

SOURCES: USA: Historical Statistics of the USA p 410.
UK: C H Feinstein, National Expenditure ... pp T89, T94-5.

*118 In 1921-22 the boom in mech.engineering caused an acute crisis in iron/steel supplies: Wd 7(1922) p 58, 'Die Eisenindustrie in der Weltwirtschaft'.

the rate of fixed investment in this sector in 1919-23 as a whole was less, relative to that in 1924-29 than it was in the UK, and very probably less relatively than in the USA as well.

Contemporary comment is disappointingly vague. 'Flight into real values' (Flucht in die Sachwerte) probably reflects intentions rather than realisations; raw materials shortages, political and labour disputes seem to have constrained the actual output in the investment goods industries severely *120. For one industry, however, there is evidence of a relatively high rate of investment: iron and steel.

Table 12 Average Output of Furnace in Blast

	Germany	USA	UK	France
1913	59	271	31	47
1924	n.a.	333	n.a.	n.a.
1925	97	359	42	57
1926	112	375	36	61

MEASURES: USA: Capacity (tonnes) per day.
All others: Average Output (000 tonnes) p.

SOURCES: USA: Stahl und Eisen 1929 p 945.
All others: I Svennilson op.cit. p 265.

Average output per furnace in blast rose faster between 1913 and 1925 in Germany than anywhere else; doubtless this partly reflects the fact that marginal (small) furnaces were standing idle, but 1925 was quite

*120 Eg Wd 6(1921) pp 609, 709, 'Zur Lage'; further the letters in BA R13 I/70 (records of VDESI); cf. the contemporary company reports of Siemens-Schuckert Werke and AEG. The 'myth' of an extraordinarily high level of inflation period investment may well originate in the desire to explain the excess capacity of the later 1920s solely from the supply side.

a boom year in Germany. The historiography of the political leverage of this industry would lead us to expect that its investment rate at this time exceeded that of other industries *121. The only other industry for which I possess quantitative evidence is cotton spinning, which exhibits no net increase in spindle stock at all *123.
In general, therefore, it seems that, except for iron and steel, the quantity of investment undertaken in 'Gewerbe' during the inflation was low, relative to that in other countries. What about its quality?

The 'malinvestment' (Fehlinvestitionen), alleged by many writers *124, may in part imply that investment in the investment goods industries was excessive, relative to that in the consumer goods industries. This construction of the term should entail therefore that, after the stabilisation, the rate of growth of the capital stock in the consumer goods industries exceeded that in the investment goods industries, by way of 'catching up'. Fischer, using Krengel's data, believes that this is so *125. But given Krengel's methods, this observation is of

*121 See recently G D Feldman, Iron and Steel in the German Inflation, passim. The argument is reinforced by the information that, during the inflation the 'centre of gravity' of the industry's investment was in steel making plant, not blast furnaces: E-A III/3 op.cit. pp 15ff.

*123 H Grunbaum, Die Welttextilkrise, p 14. Of course, cotton was especially disadvantaged by the inflation, being dependent on an imported raw material.

*124 Eg C Bresciani-Turroni op.cit. pp 197ff.

*125 Wolfram Fischer, 'Bergbau, Industrie und Handwerk 1914-70', citing R Krengel, Anlagevermögen ... pp 20, 84.

doubtful validity *126.

If Keiser and Benning's estimates of net investment undertaken by the investigated sample during 1924-28 are divided by their estimates of the net fixed capital stock of the same at 1.1.24 *127, then the rate of growth of the stock in the investment goods industries (heavy industry, metallurgy, engineering *128) and in the producer goods industries (chemicals, building, building materials etc *129) is on average not dissimilar (22% and 43% respectively) from that of the consumer goods industries (26%) *130. Clearly the significant difference is between 'new' and 'old' industries, not between 'investment'

*126 R Krengel (Anlagevermögen ... pp 15ff; Das Anlagevermögen der westdeutschen Industrie ... pp 96ff) constructed his capital stock estimates for 1924 for each of five sectors (mining, investment goods, producer goods, consumer goods and food and drink) arbitrarily to satisfy the following conditions: a) that when cumulated with net investment to 1929 they have generated a level of depreciation allowances sufficient to yield negative net investment 1930-34. But the net investment and depreciation allowances in question were artificially constructed by writing of the capital stock over 20-33 years on a straight-line basis. This seems an implausible scheme. b) that the relative sizes of the fixed capital stock in different sectors remains constant. Thus Fischer uses a series constrained to yield constant long-run proportionality, to prove the opposite on the short run!

*127 As they provide estimates for both the sample and the entire industry only in respect of investment, not capital stock, this was the only sensible procedure.

*128 Orders I and IV in Table 14 p 298 below.

*129 Orders II and III in Table 14 p 298 below.

*130 Orders V, VI and VII in Table 14 p 298 below.

and 'consumer' goods industries *131.

So much for the intersectoral distribution of investment activity. The quality of the fixed investment during the inflation might be open to question on the following grounds *132.

1 The inflation period investments utilised inferior technologies.

2 The inflation period investments were so badly constructed, or constructed out of such inferior materials, that subsequent maintenance expenditure was extraordinarily high *133.

1 could be (and/or has been) supported with the following arguments:

1a. The war and inflation cut Germany off from international advance *134. The war may have (though of course in certain fields Germany led the world). But it is difficult to see how that the inflation could have had this effect, at least in industries where large firms predominated. Industries where the typical firm is small are usually industries of slow technical change anyway.

1b. It was not possible to import the best foreign machinery. This seems to be partly true according to some observations of German mechanical engineering *135. However, even after stabilisation, the

*131 Cf Table 30 in Keiser and Benning op.cit. p 86. Rayon, petroleum and vehicles head the list; leather, margarine and shipbuilding are at the tail. Other generalisations about the growth of industrial economies might view as abnormal a growth of investment goods capacity which only equalled that of consumer goods; but the fact remains that variation of growth rates within each category is so great as to render insecure any generalisation about the relationship between them.

*132 cf the discussion in Bresciani-Turroni pp 388ff; J W Angell op.cit. pp 46ff.

*133 C Brückner op.cit. p 193.

*134 cf G Stolper op.cit. p 97.

*135 Iron Age 111/1(1923)p1259, "Machine-Tool Situation in Germany".

values of machinery imports never exceeded 5% of domestic output *136, so this can only have been of minor significance.

1c. The distorted factor cost ratios encouraged the use of techniques which were inefficient under conditions of stable prices.

It is not altogether clear in what way the factor cost ratios were distorted. Labour was very cheap, but on the other hand capital (in the sense of finance) was more or less free for those entrepreneurs that had access to it. However, delays in the delivery of capital goods may have imposed their own costs.

In certain industries acute shortages of raw materials could have compelled an adjustment of technique.

As far as capital-labour ratios are concerned, it is usually held that the choice of optimal technology of "core" manufacturing processes is insensitive to a wide range of different relative costs, but that ancillary activities may be more sensitive, for example, the handling of materials, packaging etc *137.

There is some interesting evidence on both these points. Aggregate annual capital-labour ratios or estimates of output per capita tend to be misleading, because of the high incidence of labour disputes and other interruptions. However Die Wirtschaftskurve published a series of articles which summarise the responses to direct questionnaires about the development of labour productivity *138. The responses assume therefore the absence of interruptions to the working week. They are unfortunately too multifarious to be conveniently reproduced here.

*136 See eg G Gehrig op.cit. p 38.

*137 A S Milward and S B Saul, The Economic Development ... Vol 1, pp 174ff.

*138 Wk 1(1922) H2 p54, H3 p58, H4 p54; 2(1923) p70, "Die Arbeitsleistung".

In general the data are concerned only with the output of directly productive workers (eg shop-floor workers in a factory, workers below ground in a mine). Thus the evidence relates well to my concept of "core" manufacturing processes. Examples are cited from engineering shops, coal mines, a steel-rolling mill, a cigarette factory, a shoe factory, shipyards, clothing factories, a brickyard. The sample of workers studied in each case is usually small. But the results are surprisingly uniform. In general, real output per worker fell below pre-war levels 1919/20; in 1921/22 it reocvered so that by 1922 it was either at, or in some cases substantially above 1913 levels. The investigated firms cited various reasons; among which the introduction of piece work, of new machinery, rationalisation of method figured largely. These conclusions may be confirmed by inspection of column C1 in Table 9: above p 272. This index was obtained by dividing weight of machinery produced by entire labour force. By this measure, labour productivity 1921/2 was little less than in 1925.

Thus the view that there was a great fall in productivity during the inflation is modified *139. Apart from the immediate post-war recovery, it is valid only as a description of the effects of disordered social conditions, not as a consequence of any deterioration in the quality of the capital stock. The belief that "rationalisation" was purely a post-stabilisation objective is also called in question. As already stated, the above evidence relates chiefly to "core" manufacturing processes. As regards "ancillary" activities, Die Wirtschaftskurve also supplies interesting information *140. There does appear to

*139 Bresciani-Turroni op.cit. pp 215-9.

*140 Wk 3(1924) p165, "Die Zunahme unproduktiver Arbeitskräfte; for a parallel case in elec.eng. see P Czada op.cit. pp167ff; J W Angell op.cit. pp 46ff.

have been an increase in the proportion of ancillary workers (handling, packing, clerical), to shop-floor workers, and the mechanisation and streamlining of these activities were among the major features of the post-stabilisation "rationalisation" *141.

As far as the relative costs of raw materials are concerned, there is evidence that in iron and steel at least, this factor prompted a shift in techniques. In steel making, the costs of foreign ores, hence pig iron prompted a shift towards techniques which utilised a greater proportion of scrap, ie from "Bessemer converters" towards "Siemens-Martin" ovens *142. After stabilisation, a reversion to the Bessemer process can be discerned. But despite the fuss made about this, the distortion seems very small in toto.

1d. By shielding the German economy from foreign competetion, the inflation blunted the incentive to utilise optimal technologies.

Some cite this to explain the failure of the vehicle industry to adopt mass production techniques till after stabilisation *143, but without a theory of the constraints on domestic competetion, this explanation is clearly incomplete. To this we turn.

1e, According to Bresciani-Turroni, profits and losses were entirely arbitrary during the inflation, and bankruptcy abolished *144. This may mean that in certain industries, notably the consumer goods',

*141 See *171 below.

*142 E-A III/3, Die deutsche Eisenerzeugende Industrie p 15.

*143 See ref *61.

*144 Bresciani-Turroni, p 219. Statistical confirmation is found in Wk3 (1924) p 212.

where the market was probably restricted anyway *145, small obsolete plant could compete successfully with modern plant of large capacity. These conditions, and the general politico-economic climate, doubtless also inhibited foreign direct investment. These various factors listed under 1d. and 1e. may explain the timing of the transformation of the vehicle and glass industries (see below p 287).

2. The allegation that workmanship and materials in capital goods were inferior could be sustained with the following arguments:

2a. The political/social climate may have caused a deterioration in the diligence of the labour force. The evidence as to this is conflicting. The articles about labour productivity cited above *146 contain only a small minority of criticism on these lines. Some of the reports of U.S. observers do stress a deterioration on this score *147, but the tone of others conveys a happier picture *148.

2b. The difficulty of importing may have caused inferior domestic materials to be used. The relative scarcity of steel may have caused excessive economising in its use in machinery etc. For such conjecture however I have found no specific support in the literature.

*145 cf the "Haushaltsrechungen" in Wk 1(1922) H2 p23 and in all subsequent issues 1922-23. These demonstrate clearly the expense reduction of "luxury" expenditure by the average household.

*146 See ref *138.

*147 Maschinenbau 2(1923)p 367, "Amerikanischer Urteil über den deutschen Maschinenbau". Iron Age 111/1(1923) p33, "Changed Machine Tool Shop in Germany; 112/1(1923) p 258, "Germany's Machinery Trade".

*148 Iron Age 111/1(1923) p 758, "Today's Products of the Krupp Works" 111/1(1923) p886, "Famous German Forging and Machine Plants".

2c. Delays in delivery associated with the extraordinarily high pressure of economic activity may have encouraged the builders of capital goods to "cut corners". Again this is sheer conjecture. On the other hand, in the later 1920s Americans were still criticising Germans for building blast furnaces and other equipment too solidly, for failing to "plan obsolescence and the like" *150; a little less solidity in capital goods construction here and there could do no harm. In other ways shortages could stimulate technical progress; eg in stimulating the search for heat economics in iron and steel *151 (though the reasons for the gains actually registered are a complex matter *152).

The conclusion of this subsection is therefore, that the rate of fixed investment in 'Gewerbe' in the period 1919-23 was probably lower, relative to 'normal' than it was in the UK and the USA, but that the allegations that its interindustrial distribution subsequently proved inefficient, or that its quality was inferior, cannot be satisfactorily substantiated.

8.4.3. Contemporary Impression of the Quality of the Fixed Capital Stock c.1926

I now turn to the second question on p 271 above. What was the observed rate of technical change during 1926-29? I preface this with remarks

*150 Iron Age 121(1928) p1011, "German High Tonnage Furnaces". 111/1(1923) p1259, "Machine Tool Situation in Germany". J W Angell p 115.

*151 Bresciani-Turroni op.cit. p 198.

*152 E-A 111/3, Die deutsche Eisenerzeugende Industrie p 26.

on contemporary impressions of the technical state of the stock in about 1926 - at the start of the fixed investment boom.

About this time foreigners made interesting comments about the quality of the capital stock of a number of industries. Firstly, a favourable impression from 1924: "There is no doubt of the excellent physical condition of Germany's industrial plant" *153. American observers of German heavy industry at the end of the inflation expressed general admiration of the quality of the technology *154; the criticisms voiced refer rather to the socio-economic environment than to the plant itself *155. After the stabilisation, Americans found German practice to lag their own in certain respects - notably the handling of materials *156 - but overall, the impression conveyed throughout the 1920s is that German practice is every bit as competent as the American *157. American correspondents in Iron Age also commented on the state of the mechanical engineering industry. Naturally their observations are confined to the largest, most renowned workshops. There are for example two reports of visits to Krupps. The first observer was "impressed with the organisation and efficiency of the works" *158. The second however

*153 Iron Age 113/2(1924) p 1219, 'Germany's High Costs Hamper Industry'. Cf a similar comment by J W Angell op.cit. p 238.

*154 Iron Age 111/2(1923) p 1725,'Changes in German Steel Practice'.

*155 Iron Age 113/1( ) p230, 'Year of Collapse in German Industry'.

*156 Iron Age 115(1925) p1571, 'How Germany can learn from the US'.

*157 Iron Age (1927) p1565, 'German Industry nearing pre-war Status'; 123(1929) p 939, 'German Rolling Mill Practice'.

*158 Iron Age 111/1(1923)pp756-60, 'Today's Products of the Krupp Works'.

found that "its equipment had distinctly more of old types than desirable" *159. Reports on other famous works were however generally favourable *160, with the reservation that Germans did not 'plan the obsolescence' of their equipment sufficiently fast, nor specialise enough *161. Even at the end of the 1920s it was observed that the labour productivity of German mechanical engineering was much below that of the U.S. industry *162. This may have been justified of course by relative factor costs.

A review of the German shipbuilding industry at the end of the inflation criticised it for its obsoleteness *163 - a surprising observation in view of the great expansion of the industry's capacity during and after the war.

Similar evidence about electrical engineering is scarce. A U.S. visitor to AEG was apparently impressed by the plant. "Wherever applicable with profit, western appliance and methods were adopted" *164. This is no more than one would expect.

Textiles. Here my evidence relates to the end of the 1920s. Angell and Brady thought that the German textile industry employed a technology inferior to that of the UK and the US *165. German opinion varied. A

*159 Iron Age 118(1926)pp1066-7,'German Industry striding Forward'. cf Maschinenbau 2(1923) p367,'Amerikischer Urteil ...'.

*160 Iron Age 111/1(1923) p886-8,'Famous German Forging and Machine Plant'.

*161 Iron Age 111/2(1923) p1259,'Machine Tool Situation in Germany'.

*162 Cf the statistics in Maschinenbau 7(1928) pp 384-5.

*163 Iron Age 111/1(1923) p472,'Present Plight of German Shipbuilding'.

*164 See reference in *159.

*165 J W Angell op.cit. pp 168-70; R A Brady, The Rationalisation Movement in German Industry, pp 263ff.

study-group which toured England broadly concurred with Angell, though not failing to mention examples where English technology lagged behind German *166. A trade-union spokesman in 1930 believed that, as a consequence of the 'Rationalisation', German practice was second to none, but he was trying to persuade his colleagues to take a more positive view of technical change *167. It seems doubtful whether the relative backwardness of German textiles had diminished in the period 1913-23.

8.4.4. Technical Change 1926-29

I now look directly at the importance of technical modernisation in the investment boom of 1926-29.

Before trying to summarise the details, a few general remarks on 'rationalisation' - the vogue word of the later 1920s, used to characterise the investment activity of the time - are desirable. Many of the first and foremost processes represented by this word have only minimal implications for real investment activity. For example, reorganisation of the ownership structure, cartellisation, the shutting down of obsolete plant and concentration of production in the most efficient. These headed the list in an authoritative review of 'rationalisation' in heavy industry *168. In industries such as engineering, standard-

*166 Spinner und Weber(1929) Nr 9, p 69, 'Studienreise in die englische Textilindustrie'; see also ibid. Nr 30 p 20, 'Die Lohnkosten in der europäischen Baumwollindustrie'.

*167 Spinner und Weber (1930), Nr 28 p 17, 'Rationalisierung in der Textilindustrie'.

*168 J W Reichert (Executive Head of VIESI), 'Rationalisierungsarbeiten im Kohlenbergbau sowie in der Eisen- und Stahlindustrie', Stahl und Eisen 48(1928) pp 41-2. Cf J W Angell op.cit.pp 187ff. Also the statement of F Deutsch (AEG) in Wd 10/1(1925) p 440.

isation was one of the first things implied by the word *169. Other aspects are only slightly more pertinent to real investment - eg specialisation of output between plants *170. Only after clearing these meanings out of the way do we come on the investment (technical change) associations of the word *171.

Thus, contemporary witness to the magnitude of the 'rationalisation movement' is consistent with other evidence of an only moderate rate of fixed investment.

Contemporary comment on the rate of technical change throughout industry does not suggest an abnormal rate. The techniques of a few industries were radically transformed in those years. Notable among these are vehicles *172, and plate glass. In both cases the innovation of American methods by subsidiaries of US firms forced German competitors to follow suit *173.

Given the foreign influence, it is possible that both processes were delayed by the socio-economic conditions of 1920-25.

In other industries, technical progress was rapid though falling short

*169 D Warriner op.cit. pp 29ff; 40ff.

*170 See reference *168; Verein deutscher Maschinenbau Anstalten, Die deutsche Maschinenindustrie 1927-28, pp 26-9.

*171 In confirmation of this argument see R A Brady op.cit. passim; F Meyenburg, 'Rationalisierung der technischen Betriebsorganisation'; also Clausing's distinction between expenditure on rationalisation and on innovation: op.cit. p 123. Modern writers follow this view: D Petzina, Die deutsche Wirtschaft ... p 57; K Borchardt, 'Wachstum ...' p 688.

*172 Probably true only of leading firms. Cf R J Overy, Cars, Roads ... pp 466-7; the Wd articles cited in *62, *63; the Annual Reports of Adlerwerke, NAG, Daimler-Benz, Opel, etc.

*173 See references in *105.

of "transformation". The whole range of heavy industry exemplifies this. In hard-coal mining there was both an extension of the mechanisation of extraction and change in the mechanical techniques used; in addition there was increased electrification and use of mechanical rather than animal transport underground. Above ground there was considerable improvement of coal handling, sorting and cleaning equipment *174, often accompanying a concentration of these processes in fewer larger establishments. The replacement of colliery coking plants with fewer large "central coking plants" was a notable example of a similar process *175.

In iron and steel, in addition to the moderate reversion to the Bessemer process mentioned above (p 281) there was a steady drift towards larger plant - blast furnaces, steel furnaces/ovens, and rolling mills, associated with a parallel emphasis on improved power sources and handling equipment *176. Much emphasis was put on the increased speed of processing (Durchsatz-geschwindigkeit) which these and other improvements produced as also on the gains in heat economies - a constant objective for which a special research institute was set up

*174 Stahl und Eisen, article cited in *168; Glückauf (1928) p732ff; "Gründe für die Zu-oder Abnahme der verschiedenen Gewinnungsmaschinen"; Keiser und Benning op.cit. p 42. See also relevant company reports eg Harpener Bergbau, for 1926-29; DBZ 13/3/28, p 1, "Das Ergebnis der Rationalisierung im Ruhrbergbau."

*175 KB p 42; R A Brady op.cit. p 82ff; DBZ 12/4/27 p 1, "Grundsätzliches zur Preispolitik der Eisenschaffenden Industrie."

*176 Stahl und Eisen, article cited *168; Iron Age 120(1927) p 440, "Large German Units put to work"; Ibid. p 50, "Germany Modernising Blast Furnaces"; 121 (1928) p 1011, "German High Tonnage Furnaces" 123 (1929) p 939, "German Rolling Mill Practice", also the DBZ article cited in *175.

(Wärmewirtschaftstelle) *177.

Rationalisation in iron and steel had a definite effect on employment. While output increased 1925-29 employment fell *178. It would be interesting to analyse how many of these were "core" and how many "ancillary" production workers but unfortunately I do not have the data.

There is a good deal of evidence of fairly rapid technical progress in the paper-making industry *179. This was mainly to increase precision of control of processes; but furthermore considerable sums were spent on improvement of efficiency of heat utilisation, and of the transport and handling of materials. Paper-making was an industry where despite the expenditure, even in 1930 some believed it still to lag the practice of foreigners *180. A related branch also undergoing considerable technical advance was printing *181.

Most industries however, seem to have been characterised by a rather moderate rate of progress. Almost every branch, for example, was engaged in electrification and some improvements in the handling of materials *182. In cotton, there was a slow spread in ring-spinning and the number of automatic looms *183. This seems rather typical of

*177 E-A III/3 "Die deutsche Eisenerzengende Industrie", pp 26ff; Stahl und Eisen article cited *168; J Strohe op.cit. p 25.

*178 See the statistics in E-A III/3 op.cit. p 8f.

*179 See the refs. in *103; also Keiser and Benning op.cit. pp 51-2.

*180 E-A 1/5/10, Die deutsche Zellstoff...industrie, pp 80ff.

*181 Keiser and Benning op.cit. p 74.

*182 E-A I/5/11, Die deutsche Eisen und Stahlwarenindustrie pp 221ff. Keiser and Benning op.cit. pp 39-74 passim.

*183 E Welter Stockung p 30.

many industries. In a number of industries there is a considerable evidence of a rise in output per employee, even though no specific technical advances can be pinpointed - for example electrical engineering *184. Since these gains tend to be concentrated on 1925/6 (this is true also for iron and steel) they appear to be once-over improvements after the stabilisation - perhaps also a confirmation of the distinction made above between the effects of the inflation on "core" and on "ancillary" technologies (p 279).

By adopting a branch-by-branch approach I have been ignoring the "aggregative" technical change represented by the advance of new industries, the decline of old ones - eg of rayon at the expense of cotton, the rise new consumer goods' industries - eg cosmetics, pharmaceuticals, photography, and the stagnation of older ones, eg wood-working *185.

This kind of change is even more difficult to appraise. Given the German hegemony of the world chemical and electrical industries however, I find it difficult to believe that in 1926 Germany had any especial backwardness in the development of these branches to make good.

Finally, this section gives occasion to mention the much neglected sectors; Retail and Wholesale trade. In retail trade the continued spread of multiple stores such as Woolworths, and department stores, and the assumption of wholesale functions by large retail concerns, at the expense of "traditional" wholesale, amounts to quite significant

*184 Czada op.cit. p 182ff.

*185 Keiser and Benning op.cit. p 71.

technical change in these sectors *186.

8.4.5. Conclusion: The Nature of Investment Activity in 'Gewerbe'

The evidence assembled in this section and the preceding one seems to indicate that the bulk of investment activity was probably directed toward quality improvement; far from quantitative extension having been prominent, the term 'rationalisation' implies rather a reduction in capacity by the scrapping of obsolete plant. This finding may help to reconcile the tension between the failure of the aggregate statistical estimates of capital stock utilisation to decline after 1927 (Table 4 p 255), and the subsequently described impression, gleaned from the writings of contemporaries, that such a deterioration did occur: the modern (ie non-obsolete) capital stock may have been expanding more rapidly than output in 1926-29. The perception that excess capacity thus defined was developing in 1928 may perhaps help to account for the observed reduction in investment then. Nevertheless, it was also noted that the term 'rationalisation' does not imply an exceptional rate of real innovatory investment, nor a wealth of long-gestation capital programmes. I have assembled a large number of cases where it is stated that the rate of investment is being reduced in 1928/9 because the planned programme "has reached some kind of a conclusion" ("ist zu einem gewissen Abschluss gekommen"). At first I tended to discount such statements as concealing the true

*186 Wd 13/2(1928) p 1301, "Die Ausdehnung der Warenhäuser". Wk 6(1927) p 290, "Die Rationalisierung in Textileinzelhandel," cf R A Brady op.cit. pp 263ff.

causes of the decline. The sheer amount of repetition of them, in widely differing industrial contexts, made this policy seem over-subtle; maybe they do point to a real reason for the investment decline. As the references are too numerous for a footnote, I have set them out in Appendix VII.

8.5. The Determinants of Output in 'Gewerbe'

Capacity utilisation is a joint function of the growth of the capital stock, and of the growth of output. Having considered the former, I now turn to the latter.

Output in 'Gewerbe' is partly determined by investment within the sector, and its multiplier effects. In the short run, the most significant component of this is inventory investment. I have already shown that an 'inventory cycle' in 'Gewerbe', aggravated by the tight liquidity conditions, dominated short-run macro-economic change between 1924 and 1927. Hence, the reduction in the utilisation of the capital stock in 1926. But the reduction in the rate of inventory investment from early/mid 1928 was milder and, anyway, postdates the origins of the decline in domestic new machinery orders.

In a complex modern economy, the demand from other sectors will be as, or more, important a determinant of output in 'Gewerbe'. The decline in fixed investment in sections of the public and semi-public sectors, already noted in 1928, has been described in Chapter 6. In particular, the abrupt curtailment of the German Railway Co.'s investment

programme at the end of 1927 *187 had acute repercussions on iron and steel *188, on locomotive and waggon building, small iron and steel wares and building *189.

The reduction in the rate of agricultural fixed investment in 1928 will likewise be noticed below *190.

On the other hand, exports of manufactures and semi-manufactures rose strongly at the end of the decade.

Table 13 Exports of Manufactures and Semi-Manufactures: Output of Mining and Manufacturing Mrd.Rm. (Current Prices) or 1913=100 (Constant Prices)

	EXPORTS				OUTPUT of Mfg/Mining	
	Manufactures		Semi-manufactures			
	Current Prices	1913 Index	Current Prices	1913 Index	Current Prices	1913 Index
1925	5.6	74	1.7	60	33.9*	101
1926	5.8	79	2.3	83	32.4*	93
1927	6.4	86	2.3	78	42.5*	116
1928	7.2	94	2.5	88	46.1*	116
1929	8.1	107	2.8	101	48.4*	119

SOURCE: Hoffmann ...pp 455, 508, 520. * Output of 'Gewerbe'

*187 See pp 179ff above.

*188 In 'normal' (? pre-war) times c.17% of the entire output of rolled products was railway material: Vjh.Konj.forsch.1927 H2 p 46, H3 p 42. The relevant sections of iron/steel had order books assuring six months employment in the first half of 1927 - far longer than any other sections. By April 1928 this had fallen to 4-5 weeks; cf *78 p 261above.

*189 Commerce Reports 13/5/29 p 430, 'The German Loco Building Industry'; E-A 1/5/11, Die deutsche Eisen- und Stahlwaren-industrie, pp 268ff; Zement 1928 p 1023, 'Betrachtungen zur Reichsbahnbau- und Beschaffungspolotik'.

*190 See pp 355ff and references thereto.

To some extent, this reflects the international upswing of these years, and the recovery of Germany's position on international markets. It also, however, partly represents the remedy traditionally resorted to by German manufacturers in time of domestic recession *191.

The domestic investment recession in branches of the economy other than 'Gewerbe' can fairly be ascribed to credit difficulties, according to the discussion in the relevant chapters. These are both long term difficulties, associated with the speed with which debts were reconstructed after the stabilisation - and their maturity structure; and short term difficulties, associated above all with the collapse of the domestic capital market in 1927. The credit difficulties of these sectors may have mediately affected investment in 'Gewerbe', by reducing demand for its products (especially those of the iron and steel industry - the most heavily investing branch of 'Gewerbe' at the time) and hence its capital stock utilisation.

8.6. External Financing

From Table 9a p187 it is apparent that c.70% of bonds issued by Gewerbe in the period under review were issued abroad. Naturally, only larger companies could float bonds abroad, above all heavy industry and electrical engineering *192. Shares were almost never issued abroad,

*191 'Exportventil'. See further pp 313ff below.

*192 See also Table 9a p 187 .

but this form of financing was open only to appropriately organised (and usually larger) companies. Thus there was a clear distinction between the long term financing opportunities open to larger and those open to smaller firms. Contemporaries were vividly aware of this *193. Three specialised institutions were set up in the period to raise finance abroad for smaller businesses: the Sächsische Landespfandbriefanstalt, the Pfälzische Wirtschaftsbank and the Centralbank deutscher Industrieller *194. In later 1927 the Deutsche Bank took the unprecedented step of raising a $25 mill.loan in the U.S. in order to consolidate the short term debts of its medium sized clients *195. Very probably, smaller firms had poorer access to short term credits also. On the one hand, they, above all, were often caught in a pincers between the strict payments conditions imposed by their large suppliers, and the tardy receipts of payments due to them from their customers *196. In addition, their links with the great commercial banks were poorer

*193 A Lansburgh, 'Die Finanzierung des Kapitalbedarfs der Mittel- und Kleinindustrie ...'; J Hirsch, 'Wandlungen im Aufbau der deutschen Industrie'; cf. P Czada op.cit. pp 174, 188. The Reich Federation of German Industry had a committee (on bank and credit problems) which concerned itself (with small success) with this matter: B A Nachlass Silverberg 30.

*194 For general discussion: W Hagemann, Das Verhältnis der Grossbanken zur Industrie pp 37ff. On specific institutions: Maschinenbau 6(1927) p 818, 'Die Beschaffung langfristiger Kredite fur die Industrie'; Verein deutscher Maschinenbau Anstalten, Die deutsche Maschinenindustrie 1927/8 p 58ff: MdW 9/8/28 p 1241-3, 'Industrielle Realkredit'; IHZ 15/2/27, 'Die ausländische Kreditquellen der mittleren Industrie'; P Schulz-Kiesar, 'Das langfristige Kreditproblem der mittleren Industrie'.

*195 IHZ 10/9/27, 'Die Amerika-Anleihe der Deutschen Bank'; MdW 1/8/28, 'Die Deutsche Bank Sammelanleihe'.

*196 Eg E-A 1/5/11 op.cit. p 158.

than those of the large firms *197. Savings banks partly, but only partly, remedied the deficiency *198. The distinction just drawn between the availability of external finance to large and small firms is of little relevance to the earlier downturn in fixed investment - in 1925. Domestic long term capital issuing was not yet possible till early 1926; foreign issuing was still relatively small *200. The 'liquidation crisis' which commenced in July 1925 spread to all sections of industry, irrespective of firm size.

If change in the availability of external finance was a material cause of the 1928 recession however, there should be an observable distinction between the investment behaviour of large- and small-firm industries. Since, broadly speaking, the deterioration of domestic capital market conditions (February/May 1927) antedates the definitive deterioration of foreign capital market conditions by at least a year, the investment activity of domestic-dependent (ie small-firm) industries should be observed to decline before that of large-firm industries.

*197 Throughout this period, but especially during 1927-29, credit banks lent foreign currency credits to big business at up to 2% cheaper than they extended Rm.credits to 'average' customers; M J Bonn, 'Die Wirkung des hohen Zinsfusses auf Handel und Bankwesen', pp 375-7; G Bernhard, 'Die Liquiditatsstörungen und die Krise des deutschen Bankensystems' pp 332ff. It seems very likely that the banks'demand for security on advances discriminated against smaller clients. Cf above pp 46 ff.

*198 W Prion, 'Die Sparkassen als Kreditgeber des Mittelstandes'; J Hoffmann, 'Der Aufstieg der Sparkassen', in Wk 6(1927) pp 305ff.

*200 The high degree of short term financing by firms, as a consequence of the unavailability of long term finance, excited contemporary comment: Wk 4(1925) pp 431ff, 'Die kurzfristige Verbindlichkeiten der deutschen Industrie'. This, of course, may have exacerbated the crisis.

Already the analysis of 1927 balance sheets in Wirtschaftsdienst expresses concern about the apparent level of short term financing of fixed investment in the following branches: paper *201, glass *202, flour-milling *203, leather *204, linen *205, and chocolate *206. All these industries tended to be dominated by smaller firms. Reference to Table 14 overleaf shows that gross fixed investment was less in 1928 than in 1927 in all these branches except glass *207 and leather (where it failed to rise). Apart from these industries, gross fixed investment fell (between 1927-28) in vehicles, shipbuilding, building, brandy/yeast, musical instruments, and woodworking (consumer goods). Except for the first two (both of which suffered from serious problems of excess capacity and foreign competition *208), all of these were small-firm industries. Of firms experiencing definite increases in fixed investment, only clothing and iron/steel and metal goods seem to me to qualify as 'small-firm' industries; and in neither was the increase above that for industry as a whole.

Were idiosyncratic sales developments responsible for the investment

*201 Wd 13/2(1928) p 1851, 'Die deutsche Papierindustrie'.

*202 Wd 13/2(1928) p 1152, 'Die deutsche Glasindustrie im Jahre 1927'.

*203 Wd 13/2(1928) p 1508, 'Bilanzanspannung in der Mühlenindustrie'.

*204 Wd 13/2(1928) p 1719, 'Die deutsche Lederindustrie'.

*205 Wd 14/1(1929) p 449, 'Die deutsche Leinenindustrie'.

*206 Wd 13/2(1928) p 1419, 'Die Krise in der Schokoladenindustrie'.

*207 But the glass industry was in the midst of radical technical transformation. See p 287ff above.

*208 See pp257,265 above.

Table 14 Gross Investment in Industry and Mining by Branches 1925-29; Mill R.M.

BRANCH	1925	1926	1927	1928	1929
I Mining and Smelting					
Heavy Industry	381	320	500	570	330
Lignite	56	44	72	74	65
Non-ferrous Mining and Smelt	53	38	37	47	42
Total	490	402	609	691	437
II Chemical, Petrol, Potash					
Chemical Industry	191	190	207	333	250
Petroleum Industry	27	54	72	85	96
Potash (incl. Rock Salt)	95	52	35	38	46
Total	313	296	314	456	392
III Misc. Producer Goods Industries					
Paper Industry (Paper Making)	69	51	85	70	69
Building Industry	70	40	72	63	54
Building Materials Industry	82	69	86	108	90
Rubber and Asbestos	17	15	13	13	13
Saw-Milling	10	9	8	8	8
Leather and Leather Goods	14	7	11	11	10
Total	262	191	275	273	244
IV Engineering and Related Industries					
Electrical Engineering	68	61	78	84	83
Mechanical Engineering	154	90	112	128	96
Vehicles, Motor-Cycles, Cycles	64	47	65	60	46
Locomotive, Waggon Building	9	7	10	16	12
Shipbuilding	6	9	13	9	10
Total	301	214	278	297	247
V Textile and Clothing Industries					
Spinning and Weaving	170	137	154	177	141
of which: Wool	(60)	(48)	(41)	(54)	(63)
Cotton	(55)	(54)	(72)	(79)	(44)
Coarse Fibres	(19)	(11)	(13)	(12)	(15)
Silk, Combined Firms	(36)	(24)	(28)	(32)	(19)
Other Textile Industry *	94	69	63	93	53
Rayon	30	23	56	67	22
Clothing Industry	20	9	13	17	15
Shoe Industry	6	5	11	11	6
Total	320	243	297	365	237

Table 14 (cont'd)

BRANCH	1925	1926	1927	1928	1929
VI Food, Drink, Tobacco					
Brewing and Malting	107	112	120	138	118
Chocolate and Confectionery	23	12	20	15	15
(Flour) Milling	24	16	22	16	15
Brandy and Yeast	16	8	13	10	10
Sugar Industry	24	17	15	18	10
Margarine and Other Fats	14	9	12	15	19
Other Foodstuffs, Tobacco	72	49	51	65	70
Total	280	223	253	277	257
VII Misc. Consumer Goods Industries					
Printing and Publishing	65	81	70	85	58
Fine Ceramics and Glass	25	36	30	41	23
Musical Instruments and Toys	12	10	14	11	8
Iron, Steel, and Metal Goods	60	49	59	72	63
Clocks, Optical, Precision Eng.	17	9	12	13	10
Woodworking (excl. Saw-Mills)	20	12	21	18	20
Linoleum	8	4	4	4	5
Paper Processing Industries	10	8	12	12	12
Total	217	209	222	256	199
TOTAL ALL INDUSTRY	2183	1778	2248	2615	2013
I - IV Producer Goods Inds.	1366	1103	1476	1717	1320
V - VII Consumer Goods Inds.	817	675	772	898	693

* ie Knitted Goods and the like.

SOURCE: Stat.Jb.f.d.dt.R. 1938, p 566.

Table 15 Selected Annual Real Output Statistics

	1926	1927	1928	1929	1930
Hard Coal	96	102	100	108	95
Raw Steel	86	113	100	112	79
Lignite	84	91	100	105	88
Non Ferrous Rolling Mill Products	96	103	100	95	72
Petroleum					
Potash	75	89	100	107	96
Rocksalt	82	95	100	106	102
Paper	77	94	100	99	95
Building Activity	69	92	100	98	82
Cement	79	97	100	93	73
Bricks	69	106	100	91	72
Wood	76	105	100	86	67
Leather (total)	85	113	100	91	82
Elec.Engineering	-	-	100	119	107
Machinery	61	80	100	101	83
Private Cars	33	84	100	89	72
Lorries	35	80	100	121	72
Shipbuilding	85	93	100	120	104
Cotton Yarn	-	113	100	86	82
Cotton Cloth		104	100	92	92
'Kammgarn'		115	100	97	104
'Streichgarn'		105	100	96	94
Wool Cloth		109	100	85	86
Coarse Fibres		110	100	99	81
Linen Yarn		163	100	88	83
Linen Cloth		150	100	93	76
Silk Yarn		120	100	96	92
Rayon Yarn		85	100	91	87
Knitwear etc		104	100	78	70
Clothing	79	110	100	93	89
Beer	87	90	100	103	93
Malt	90	97	100	108	87
Chocolate	81	93	100	102	100
Milled Flour	100	101	100	99	96
Brandy	69	74	100	110	92
Sugar	90	90	100	107	132
Margarine	94	95	100	106	108
Musical Instruments) Toys)	102	117	100	80	46

SOURCE: Ifk, Konj-stat.Hdb. (1936) pp 49-50.

patterns in these industries between 1927 and 1928? See Table 15 p 300. Output fell definitely in linen and leather; increased clearly in building and chocolate *209. There was also a pronounced output fall in iron/steel; yet investment in this branch rose. Output does not seem to correlate as well with the reduction in gross fixed investment as does the evidence of external financial constraints. The domestic financial collapse, affecting most acutely industries populated by smaller firms, seems therefore to be the factor most closely related to the reduction of gross fixed investment in 1928 *210.

Of the industries listed whose 1927 balance sheets excited the disquiet of Wirtschaftsdienst analysts, only paper *211, and glass *212 were analysed again for 1928; in both cases the same disquiet was again expressed. Additional branches whose balance sheets excited

*209 Output data are not available for glass.

*210 One notable feature of the domestic stock market after May 1927, even during its weak recovery in 1928, was the total absence of issues of medium sized firms, who had participated quite strongly in the stock market boom: Vjh.Konj.forsch. 1928 H1A p 11.

*211 Wd 15/1(1930) p 539, 'Entwicklung und Lage in der Papierindustrie'.

*212 Wd 14/1(1929) p 1065, 'Die deutsche Glasindustrie im Jahre 1928'.

concern on this score as regards 1928 were hard-coal *213, vehicles *214, linoleum *215, jute and hemp *216, and knitted goods *217. Other industries did not exhibit these symptoms. Wirtschaftsdienst analysts found nothing to warrant unfavourable comment in the 1928 debt patterns of cotton-weaving *218, textile machinery *219, electrical engineering *220, cement *221, and rubber *222. For iron and steel I found conflicting views *223.

*213 Wd 14/2(1929), 'Die Lage des westfälischen Steinkohlenbergbaues'. Illustrative, or, possibly, determinative of this observation is the direct evidence of cancellation by Harpener Bergbau AG (the largest Ruhr 'pure coal' concern) in November 1928, of 45% of the capital expenditure programme ratified at the board meeting of July 1928. BA Silverberg Nachlass 204 pp 169,218. Since Harpener was one of the few large firms to mention illiquidity in its Annual Report for that year, and the only German private co. to float a foreign loan in early 1929 (Wk 8(1929) pp 25,140, 'Deutsche Anleihen im Ausland'), its case may however be extreme.

*214 Wd 14/1(1929) p1018, 'Die deutsche Kraftfahrzeugenindustrie im Jahre 1928'.

*215 Wd 14/2(1929) p 2124, 'Die deutsche Linoleumindustrie'.

*216 Wd 14/1(1929) p 275, 'Die deutsche Jute- und Hanfindustrie'.

*217 Wd 14/2(1929) p1770,'Die deutsche Wirkereien und Strickereien seit 1927'.

*218 Wd 14/2(1929) p 1719, 'Die deutsche Baumwollwebereien'.

*219 Wd 14/2(1929) p 1366, 'Die deutsche Textilmaschinenindustrie'.

*220 Wd 14/1(1929) p 360, 'Zur Lage der deutschen Elektrotechnischen Industrie'.

*221 Wd 14/1(1929) p851,'Die deutsche Zementindustrie im Jahre 1928'.

*222 Wd 14/2(1929) p2254,'Die deutsche Gummi-industrie im Jahre 1928/9'.

*223 Wd 14/1(1929) p1053,'Zur Lage der deutschen Eisenindustrie' ascertains no over-extension of short term debt. Konj.berichte 'Westen' 1932 H2 pp 21-6,'Zur Bilanz der rheinisch-westfälischen Grosseisenindustrie', and J Strohe op.cit. pp 31-39 reach the opposite conclusion, but both with hindsight. W Treue found evidence of growing illiquidity at this time in his history of Ilseder Hütte (Die Geschichte ... pp 519-20).

In trying to relate this information to the data on gross fixed investment between 1928 and 1929 (Table 14), textile machinery and cement have to be equated with mechanical engineering and building materials respectively. This done, comparison of the above remarks with Table 14 will show that there is less relationship between the pattern of investment change and reports of excessive short term debt, than was the case in 1927.

On the other hand, there is better evidence to relate the investment decline between 1928-29 to real factors, than there was in 1927-28. This can be shown by comparing the investment data in Table 14 with the output data in Table 15.

The sector in which, on average, gross investment fell least 1928-29 is food, drink and tobacco, that is, the branch whose output was the most stable, both in the long run, and 1927-29 in particular.

The sector which displayed the greatest fall is textiles. This seems clearly related in aggregate to the fact that output fell more 1927-28 in textiles than in any other sector. This has already been attributed to the operation of a textile inventory cycle. Nevertheless, within textiles, the steepest fall in investment occurs in rayon, a branch for which output rose 1927-29 at a fast rate. In this case however there is clear evidence of the emergence of serious excess capacity in 1928 (p 257 above), perhaps in accordance with the "model" of an industry where technical change is rapid and gestation periods long.

Evidently the relative rates of decline of gross investment in other branches of the textile sector are not solely connected with the relative prior rates of fall of output. For example, compare output and investment figures for cotton and wool-spinning and weaving. Investment fell in cotton, rose in wool, despite similar output development.

This however fits in with evidence cited earlier, that in 1928, the cotton branch was less prosperous than the "Kammgarn" branch *223A. The knitted goods branch registers a severe decline in investment; also output 1928-29; and there is non-quantitative evidence of the emergence of excess capacity *223B.

Other branches for which gross investment fell dramatically 1928-29 are:

(1) Heavy Industry. As the chapter has shown, this decline has an abundance of explanation, without introducing external financial factors. Firstly capacity was excessive in this branch throughout the period 1924-29 except part of 1927; nor was the productive plant obsolete. The inference that therefore the investment boom was relatively weak and may itself have been beginning to come to a natural conclusion is abundantly supported in contemporary comment (Appendix VI). The degree of utilisation fell away after 1927 as already stated; finally the internal cash flow was caught to an unusual degree between the pressures of rising wage costs and falling average prices due to the increasing proportion of iron and steel directly and indirectly exported. This industry registered one of the sharpest falls in profits 1927-28 *224.

(2) Shoes. This industry was severely afflicted by foreign competition (p269). In 1929 domestic sales increased somewhat; accordingly gross investment expenditure rose in 1930 to Rm 8 mill.

(3) Sugar. I have no evidence at all about this branch.

*223A See Footnotes *91 and *93 of this chapter.

*223B See Footnote *92 of this chapter.

*224 M Sweezy, 'German Corporate Profits 1926-38', p 390. This is discussed further in the next sections of this chapter.

(4) Glass and Ceramics. The technical transformation of the plate-glass (Flachglas) section of the glass industry was substantially complete by 1929 (p 287and refs thereto; also Appendix VI). As a consequence, considerable excess capacity emerged in glass in 1928-29; excess capacity was also evident in porcelain.

(5) Publishing, Printing. There was considerable technical progress in this branch (p289). We may therefore have to do here with the 'natural conclusion' of investment programmes.

Two branches which might have been expected to appear in this list, do not. The first is vehicles. But in this case there is evidence that even in 1929 the technical transformation was not yet complete (p 287). The second is flour milling. But from Table 14 it can be seen that already by 1928 gross investment had fallen appreciably in this branch. This is consistent with the fact that for this branch my information of excess capacity refers to 1927 (p 269).

Did the exceptions prove the rule? What about branches where gross investment in 1929 was as high as, or higher than in 1928?

1) Petroleum. The output statistics confirm that this was a growth industry.
2) Potash. Output of potash and rock salt increased 1927-29.
3) Paper-making. Output rose 1927-28; fell 1928-29. This is the only branch for which I have evidence that 'intrinsic' demand for modernisation remained strong into 1930 (p 289).
4) Rubber. Output increased 1927-29.
5) Electrical Engineering. Output increased 1927-29 *225. The annual

*225 cf also the estimates in G Gehrig op.cit. p 38.

reports of AEG and the Siemens concern indicate that not until 1929 did the investment programme begin to reach a conclusion (Appendix VI).

6) Shipbuilding.. Output increased appreciably 1927.

7) Wool. This is hard to explain in terms of my theory.

8) Coarse Fibres. As for wool. It is interesting however that investment declines in wool and coarse fibres were greater than for any other textile branch in 1930. Thus it looks like some sort of delayed reaction.

9) Brandy. Output rose appreciably 1927-29.

10) Margarine. Output rose 1927-29.

11) Wood working. I lack the statistics to explain this case. The evidence of the relevant sections of the Vjh.Konj-forsch. suggests that output in 1928 was less than in 1927, but recovered somewhat in 1929 due to improved orders from railway waggon building, shipbuilding and for furniture *226. This does however pre-suppose a shorter lag between output and investment than I have usually worked with.

12) Linoleum. Output increased considerably 1927-28; it fell in 1929, and gross investment slumped in 1930.

13) Paper Processing. Perhaps as for paper-making.

The only branch not already mentioned, for which output increased appreciably 1927-28, but gross investment fell 1928-29, is mechanical engineering. Here, as already remarked, presumably the pervasive excess capacity obscured any real link between investment and output.

*226 Vjh.Konj.forsch 1928 H3B p 31ff; 1929 H2B pp 32ff.

8.7. Internal Financing

In Table 16 below data are presented on (A) capital income, (B) profit rates, (C) the wage-income ratio and its components: ie (D) the price of manufactured goods, and (E) unit wage costs, which in turn decomposes into (F) money wages, and (G) labour productivity.

The availability of internal finance has been obliquely considered by a number of German historians *227, who recognise the relevance of wage increases in the late 1920s to this issue, but not exactly in the analytical context of this chapter.

This subsection asserts that firms' internal cash flow was reduced in the period 1927-29 by two developments.

(i) A 'wages explosion' which increased real wage costs, and reduced profits' share.

(ii) An increase in the proportion of output exported, in virtue of the fact that in many significant branches export prices were below domestic.

I consider first, as a general indicator of the development of the internal cash flow, the behaviour of capital income and profits. All series in Table 16A and 16B agree that these magnitudes fell in 1928. However, as the notes to that Table explain, columns (1), (2) and (4) are not independent, so it is the agreement between these and (3) that is of interest. This of itself refutes two possible criticisms of the statistics.

*227 See p153ff above; also K E Born, Die deutsche Bankenkrise, pp 35-6.

Table 16 Internal Financing 1924-29 (Gewerbe, unless otherwise stated)

	A Capital Income Mrd Rm	B Profit Rate % (i) 'Gewerbe'	(ii) Industry Trade Commerce	(iii) Whole Economy
1925	2.6	(3.1)		6.8
1926	2.3	2.1	4.1	5.9
1927	5.9	6.4	5.5	10.2
1928	5.3	5.5	4.9	9.6
1929	5.5	5.5	3.6	9.8

	C The Wage Income Ratio %	D Price Indices (i) Raw Materials Semi Manufactures	(ii) Finished Goods	E Unit Wage Costs (Index)
1909/13	63	-	-	-
1925	58	141	157	96
1926	60	130	150	98
1927	59	132	147	97
1928	63	134	159	102
1929	62	132	157	108

	F Money Earnings (i)	(ii)	G Output per Occupied Person (1913 Prices Index)	H Real Earnings
1913	63	100		91
1924	-	115	-	-
1925	89	145	1.64	93
1926	93	148	1.63	96
1927	99	160	1.78	98
1928	107	173	1.73	103
1929	113	184	1.75	108

SOURCES for Table A, B(i), F(ii) : Hoffmann pp 205-6, 471, 508.

B(ii) : M Sweezy op.cit. p 391. Bottom line.

B(iii), C, E, F(i), H : E H Phelps Brown & M Browne, op.cit. App. 2 p 385 Table 114 Col 2; App. 3 p 438 Cols 1, 3, 8, 9, 10.

D(i), D(ii) : IfK, Konj.stat Hdb (1936) pp 101, 104.

G : See Appendix V p 438 Table J(i).

NOTE to Table A : Capital Income. Hoffmann obtained this by multiplying the profit rate (Table B(i), 1926ff) into the capital stock at original purchase prices (Hoffmann p 503), plus an estimate for the value of land used by "Gewerbe", of $\frac{1}{3}$ of value of building stock. He does not state how he got his 1925 estimate.

NOTE to Table B : (i) Hoffmann: H. derived estimates of absolute profits from official statistics of balance sheets of Aktien Gesellschaften in Gewerbe. He divided these by corrected estimates of net assets from the same sources. The purpose of the correction was to eliminate changes in concealed investment. He did this by recalculating the official estimates on the basis of the assumption of a fixed depreciation rate (Vid. Hoffmann pp 780ff).
To obtain a 1925 estimate I divided Hoffmann's estimate of capital income (see Note to Section A) into the capital stock estimate for 1924 (Original purchase prices).

(ii) Sweezy: These estimates refer to net profit rate after deduction of estimated Corporation Taxes. They cover the class of Aktien-gesellschaften, and Gesellschaften mit beschränkter Haftung whose nominal capital exceeded 1 mill.Rm., or which were listed on German stock exchanges. The profit rate gross of corporatinn tax was calculated by dividing net income by net worth, on the basis of St.Reichsamt statistics. She does not state how she obtained a net (after tax) rate from the gross rate; presumably the St.Ra data also provides the necessary information. cf Sweezy op.cit. p 385-6.

(iii) Phelps Brown & Browne: This is inferred on the basis of the estimates of the share of wages in total output in 'Gewerbe' (see Section C).
Let $\frac{W}{O}$ be an estimate of the share of wages in total output in 'Gewerbe', where W = total wages in 'Gewerbe' O = total value added in 'Gewerbe'.
Let $\frac{P}{O}$ be an estimate of capital's share in total output in 'Gewerbe', where P = capital income,
and $\frac{K}{O}$ be the capital output ratio in 'Gewerbe' where K = the capital stock.
Then define $\frac{W}{O} + \frac{P}{O} = 1$
Then $(1 - \frac{W}{O}) \frac{O}{K} = \frac{P}{K}$ ie is Phelps Brown & Browne's estimate of the profit rate.
Phelps Brown & Browne's estimate of $\frac{W}{O}$ is subject to bias, but one that is a function of long term structural change only and unlikely to affect year-to-year comparability.
(Vid. EHPB + MB pp 60-66, 253-7, 384-6.)

(a) The estimates in columns (1), (2) and (4) are based on the balance sheets of Aktien-Gesellschaften - ie of larger firms. Since Sweezy's data tend to show a bigger decline for smaller-firm industries, *228, this is rather a point in favour of the hypothesis of an overall reduction in internal cash generation, except under unlikely suppositions.

(b) The degree of undervaluation of assets increased 1927-28. This objection seems unfounded; I can think of no reason why firm's desire to conceal their profits should have systematically increased in this way.

Thus, I conclude that the sources of internal finance did fall. I now turn to the relationship between this, and the 'wages explosion'. Table 16 shows that over 1926-27, money wage earnings rose (on average at roughly the same rate as output per worker) so that unit wage costs fell slightly. Prices were stable (on average) though raw material prices showed some tendency to rise. However, aggregate output rose strongly (see Table 13 p 293); the net effect of all these forces was that capital income and the profit rate rose; the wage-income ratio fell. In 1927-28 real output per worker apparently fell. This is doubtless a result of approaching the top of a cyclical upswing. Finished goods prices rose c.9% and semi-manufactured and raw materials prices rose c.2%, but the rate of wage increase accelerated from about 11% in 1926-27 to about 14%. As a result of this, and stagnating productivity, unit wage costs increased about 5%. After paying the increased raw materials prices, evidently more of the net product went to labour than to capital,

*228 M Sweezy op.cit. pp 390-1.

as a result of wage pressure, for the wage-income ratio rose sharply, and capital income and the profit rate declined. There was little further change in 1929, according to all sources except Sweezy. A hypothesis to account for this wages pressure has already been presented *229.

Indirect evidence that wage rises were eroding the internal cash generation by firms is provided by the upsurge of strikes and lockouts in 1928 *230. The 1927-28 increase in man-days lost through these is far greater than can be explained by the modest ex post acceleration of wage increases. Employers' resistance must have hardened. The celebrated Ruhr lockout in November 1928 by the North-Western group of employers in heavy industry and engineering *231 had many complex political and legal roots *232, but it hardly seems too far-fetched to regard the erosion of the internal cash generation by wage pressure as a fundamental provocation *233. According to Sweezy's calculations *234, profits in iron/steel slumped badly in 1928 (partly however as a consequence of the lockout and of increasing export dependence). Contemporary complaints about the inexorable wages pressure (ie on the part of employers) are at least as widespread as complaints about lack of external financing. The annual report of practically any company for

*229 See pp149ff above.

*230 See Table 3 p152 above.

*231 U Hüllbusch, 'Der Ruhreisenstreit und die Gewerkschaften'.

*232 E Fraenkel, 'Der Ruhreisenstreit ...'.

*233 See Deutsche Bank, Annual Report (Geschäftsbericht) for 1928; also Wd 13/1(1928) p 88, 'Die Eisenpreiserhöhung und die deutsche Wirtschaftspolitik'.

*234 M Sweezy op.cit. p 390.

the years 1927-29 will be found to express this grievance, from large companies like Siemens *235 to medium-sized firms like Christian Dierig AG (textiles) or Vogtländische Maschinenfabrik (engineering) *236. At a more sophisticated level, wages pressure was widely regarded as one of the chief causes of the general scarcity of capital, because it redistributed income away from the saving classes *237. In response, trade unions sometimes denied that profits were being eroded *238, but more often they seemed to accept this as a fact, but deny the consequences, either by elaborating a purchasing power theory of the trade cycle, or by asserting that workers saved as much as capitalists *239. It was argued that the rationalisation was compelled by rising wages *240; on the other hand that rising wages ate up all the fruits of rationalisation *241.

The object here is not to survey the validity of these theories, but to show that most participants from both sides of the controversy agreed that capital's share was falling; secondly to infer from the intensity of the attack by the 'capitalists' that they were unusually disquieted

*235 P Czada op.cit. p 185.

*236 C Dierig AG, Annual Report for 1929; Vogtländische Maschinenfabrik, Annual Report for 1927-28.

*237 For a succinct account of the controversy: Wk 7(1928) pp 392ff, 'Lohnniveau und Kapitalbildung'.

*238 Eg Vorwärts 16/8/27 p , 'Die Textilindustrie verdient'.

*239 Maschinenbau (1930) p W16, 'Lohnhöhe und Kapitalbildung'.

*240 Spinner und Weber (1930) Nr 28 p 17, 'Rationalisierung in Textilindustrie: Standpunkt der Textilarbeiter'; at a more sophisticated level, A Reithinger, Stand und Ursachen der Arbeitslosigkeit ... pp 22ff.

*241 Jahresbericht der ... Industrie- und Handelskammern des Ruhrbezirks, 1928 pp 107ff (about hard coal).

by the advance of wages, and sought to generalise from their own problem to an explanatinn of what was wrong with the entire economy. Concurrent with this attack on wages was a tremendous attack on the social insurance contributions required from employers, and on taxes, also on the grounds that it reduced the sources of savings *242. Businessmen doubtless always complain of these things, but seldom with the intensity apparent in these years. Surely this is further evidence of the perceived acute inadequacy of internal cash generation. Tax rates did not increase after 1924 nor, except for the institution of the Reich Institute for Employment and Unemployment Insurance, did social insurance contributions *243; insofar as taxes did materially affect cash generation, it would be the long-term transition from a period of no taxes and high demand, to a period of high taxes, and lower demand, that created the problem, not a short term deterioration during 1924-29 *244.

The second cause of constriction of internal cash generation was the rising proportion of goods exported. This can be verified from Table 13 p 293 above.

Exports of manufactures and semi-manufactures were about 22% of the total output of 'Gewerbe'; higher for mining and manufacturing alone *245,

*242 Eg P Kempner, 'Private Kapitalbildung und Steuersystem ...'; or Darmstädter und Nationalbank, Annual Report 1927.

*243 See pp 92 ff above.

*244 A conference convened to discuss this topic concluded that no feasible reduction in tax rates would have had much effect on savings: see Wd 15/1(1930) p 569, 'Zum Thema Kapitalbildung und Besteuerung'; the full report is G Colm und H Neisser, (eds) Kapitalbildung und Steuersystem.

*245 Hoffmann ... pp 508, 520.

so that the export price level was a significant factor. The evidence that export prices were lower than domestic is almost entirely qualitative *246. It is at its best for the iron and steel industry. When iron and steel tariffs were reintroduced in 1925 the industry was forced again to negotiate an ageeement with the iron/steel using indus ries, that it would reimburse the difference between home and export iron and steel prices for the metal embodied in any product that could be shown to have been exported. This so-called 'Avi-Abkommen' is clear proof of the price gap *247. A graph of the average prices ('Erlöse') received by members of the crude steel syndicate *248 shows a steady decline in 1928 *249, because of the increasing proportion of direct and indirect exports. Support for this evidence is found in a letter from Peiner Walzwerk (a mid-German firm supplying the home market exclusively) to the central office of the crude steel cartel, complaining bitterly at its being forced to subsidise the export drive of the western works *250.

However, the iron and steel was in an especially bad position, in

*246 Comparison of prices is inconclusive because of quality differences, even in iron and steel; see the endless argument, eg in MdW 2(1928) pp 725ff, 'Die Eisenpreise in Deutschland und England'; ibid. pp 1127ff, 'Nochmals ... Eisenpreise'; E-A III/3 op.cit. pp 97ff; J Strohe op.cit. pp 148ff. For other manufacturing, such comparison would be impossible.

*247 U Nocken, 'Interindustrial Conflicts and Alliances, as exemplified in the Avi Agreement'; E-A III/3 op.cit. pp 105ff.

*248 D Warriner op.cit. pp 86ff.

*249 VDESI, Bericht über die Mitgliederversammlung 1928 (by J W Reichert). Regretably, I failed to note the page on which this graph appeared in the pamphlet.

*250 BA R13 I/45, letter dated 28/8/28; cf W Schulz zur Wiesch, Der Zusammenschlussbewegung ... pp 80-1.

virtue of its own heavy export dependence, and that of its principal domestic customers. But there is also considerable evidence that mechanical and electrical engineering, as well as the smaller iron and steel goods branches found export prices below domestic on their own account; also the paper industry *251. Authoritative commentators regarded lower prices as characteristic of exports as a whole *252.

Having reviewed the evidence of a reduction of the internal cash flow, and its causes, two comments should be added.

Firstly, neither of the causes is completely independent of factors discussed elsewhere in the chapter. Specifically, both are in measure consequences of the failure of the domestic market to expand in 1928. But both contain 'autonomous' elements as well; the dynamics of post-inflationary wage pressure, and the world trade boom of 1927-29.

Secondly, the timing. From the statistics of Table 16, and the date of the levelling off of domestic sales, it seems to me that it would be possible to place the beginnings of the reduction of the internal cash generation quite early in 1928. Thus it would coincide with the reduction of investment intentions, but not lead it. The short-run evolution of the export ratio can only be inferred; probably it also rose from the beginning of 1928 *256. Thus, both of these influences on the internal cash flow can be regarded as having intensified, but not initiated the downturn.

*251 Maschinenbau 9(1930) pW170,'Die deutsche Maschinenindustrie im Jahre 1929'; Vjh.Konj.forsch.1929 H2B p14; P Czada op.cit. p191; Bergmann Elektrizitätswerke AG, Annual Report 1929; E-A 1/5/11 op.cit. p 457; E-A 1/5/10 op.cit. pp 135ff.

*252 E-A 1/5/20/2 Der deutsche Aussenhandel ... p442 (also diagram); cf R Wagenfuhr, Die Bedeutung des Aussenhandels ... pp 28ff.

*256 Konj.Stat.Hdb.(1936) p 93, Table 12; and p 54, Tables 10, 11.

8.8. Conclusion

To organise this summary of the argument of this chapter, I refer to the four causes of fixed investment recession, listed at the outset, on p 235. I also recollect that, of the observed reduction of fixed investment activity in industry between 1928 and 1929, 40% occurred in heavy industry, and 21% in textiles (cf Table 14 p 298). The proferred explanation must therefore be congruent with the importance of these branches.

Firstly, I consider the role of external financing. That this played a part in initiating the investment recession in this sector, during 1927-28, seems likely, from the discussion in section 8.6. But it seems to have faded into the background as the recession became serious in 1928-29. Doubtless heavy industry experienced financial stringency, but of all branches of industry, given the acceptability of its debt abroad, and the closeness of its relationship with the great banks, surely it was best placed to minimise the effects of such stringency *257. It seems unlikely that the textile industry was worse placed in respect of external finance, than any other branch.

Both these branches were however united by evidence of a marked decline

*257 One might argue that the relatively high rate of investment by this branch (measured by the fact that its share of industrial investment greatly exceeded its share of industrial net value added) precipitated a severer debt burden, hence dependence on capital market conditions, than in other branches. But this argument would apply also to elec. engineering, and the public electricity supply, also heavily dependent on foreign bond issuing. Yet investment in these branches did not fall in 1929. Cf Table 9a p 187 above.

of capacity utilisation *258. In the case of iron and steel (also cement) this partly reflects constraints on buying by the public sector and agriculture; hence the constraints of the domestic financial markets, and domestic constraints on access to foreign financial markets. In the case of textiles it seems to be a reflection of an inventory cycle; also international over-building (rayon). By contrast, it seems likely that in certain export-orientated branches (eg mechanical engineering), where capacity utilisation rose at the end of 1920s, the absolute level of utilisation remained so low as to inhibit any general effect on investment plans.

In the case of heavy industry, and of many other industries where technical change was appreciable, a further explanation would complement this: that 1928-29 witnessed the endogenous end of a 'rationalisation boom' *259. But why did this boom peter out after only about three years, when apparently a considerable backlog of opportunities for improvement had been created by the war, and by the low investment rates of the inflation? One answer could be that 'rationalisation' increased the proportion of 'technically advanced' capital stock that was underutilised; hence (given low endemic utilisation rates) inhibited further innovatory investment.

*258 See pp256ff above. There is a remarkably close parallelism between the aggregate index of textile output, and the index of domestic new orders for textile machinery. See Konj.Stat.Hdb. (1936) pp 281, 282.

*259 Cf Appendix VI.

A further, cogent, possible answer is provided by Hardach.

> "The high credit costs depressed investment activity and influenced its time structure; in the 1920s it was mainly short-term investments that were undertaken, with a view to rationalising and rounding out existing plant" *260.

Coupled with the conclusion of Chapter 3 of this thesis, that investors expected the capital market rather definitely to return to normal, it seems plausible that only short-gestation and quick pay-back projects were, in the main, embarked on immediately in the 1920s; longer gestation and payback projects were deferred till such times as the cost of finance had fallen.

Finally, the deterioration of the internal cash flow, owing to wages pressure, which built up from later 1927 as a result of the renewed high employment, and owing to the increasing dependence (especially in the case of heavy industry) on lower-price foreign markets, further aggravated liquidity problems.

The roots of the decline of fixed investment in 'Gewerbe' at the end of the 1920s cannot therefore be simply ascribed to exogenous factors such as the cessation of the inflow of foreign capital; they lie embedded in the structure of the post-stabilisation economy - the long-term dynamics of its capital and labour markets.

*260 G Hardach, Weltmarktorientierung ... pp 148-9, " ... in den zwanziger Jahren wurden hauptsächlich kurzfristige Rationalisierungs- und Ergänzungsinvestitionen durchgeführt".
It seems likely that in addition, in 1929 a sharp deterioration in business expectations occurred. This is separately commented on in MdW 28/2/29, pp 307ff, 'Unternehmermüdigkeit', and E Welter, Stockung ... p 27.

AGRICULTURE AND THE 1928 RECESSION

1 INTRODUCTION

The object of this chapter is to assess the part played by agriculture in the German economy 1924-29. The general coverage of the term 'agriculture' is obvious. It is usually subdivided into two main sections - (i) arable, being the part concerned with the production of grains, root crops, market garden produce etc, and (ii) livestock, comprehending the production of meat and poultry, and other animal products such as wool, hides, dairy produce, eggs etc. Most agricultural enterprises operated of course in both sections.

Very often the relevant statistics lump agriculture together with forestry and fishing, to make a larger 'primary' sector. This 'primary' sector is however dominated by agriculture both in respect of quantity of output and of year-to-year change in output. The discussion in the chapter therefore ignores forestry and fishing.

In this chapter I concentrate on the 'behavioural' or 'economic' relationship between agriculture and the rest of the economy. The discussion of these in section 2 forms the bulk of the chapter. In a piecemeal study like this the complex mutual causation of change between the sector or variable under discussion and the rest of the economic system has somehow to be simplified. As far as investment in the private sector is concerned, well accepted simple models of this interrelationship were available - the

so-called 'inventory investment' and 'fixed capital formation' functions. In the case of public sector investment we can assume substantial exogeneity: public sector investment affects short-run activity in the rest of the economy, but, in a simple behavioural sense, is not significantly affected by it.

In agriculture, no such simple ready-made solution is available. The principal direct effect of agriculture on the level of activity in other sectors obviously operates through the demand exercised by agriculture for the output of these sectors. Is this demand however merely the reflex of the converse, viz. of the demand exercised by the non-agricultural sectors for agricultural output? The agricultural sector was, after all rather smaller than the sum total of the rest of the economy. If agricultural demand is merely a reflex, then it would not seem worth devoting much attention to it, any more than for example to the behaviour of consumer expenditure in a simple 'textbook' Keynesian model.

However there do seem to be adequate grounds for believing that the demand exercised by arable was determined 'exogenously' to a significant extent, because of its relationship with the international market.

Agriculture can be expected to affect the level of activity in the rest of the economy in <u>indirect</u> ways also. The first such way is by the effect of the price level of agricultural commodities on the real income of consumers of these commodities (by comparison with a counterfactual alternative price level); hence (given the income inelasticity of demand for agricultural products) the effect of this price level on <u>non-agricultural</u> demand for non-agricultural output and imports.

A second of these indirect effects is that of agricultural net borrowing on the 'general' interest rate and hence on the level of investment in

other sectors.

These two 'feedback effects' are considered in section 3.

It should finally be noted that, despite its inaccuracy in certain respects, 'farm' has been used to translate landwirtschaftlicher Betrieb, although this translation may seem to connote a homogeneity of type of enterprise foreign to German conditions. The responsible decision-maker within the 'farm' will be termed 'farm operator'.

9.2. Economic Relationships between Agriculture and the Rest of the Economy

Table 1 Agricultural Production Mill. 1913 m. *2

	1 Production* in Agriculture	2 Production* in Arable	3 Production* in Livestock	4 Production* in L'stock Products
1925	9198	2677	3916	2605
1926	8619	1928	4036	2658
1927	9559	2297	4372	2890
1928	10975	3034	4897	3044
1929	10872	2931	4823	3118
1930	10634	2607	4814	3213

*Production is defined as Crop Yields, Animal Slaughterings etc. minus (seed grain + feedstuff + loss).

SOURCE: Hoffmann ... p 310.

*2 Hoffmann's current value data on production (see sources to Table 1 above) closely match that of the Konjunktur-Statistisches Handbuch (1936) pp 175-6.

9.2.1. The economic interrelationships between the agricultural sector and the rest of the economy will be analysed with the aid of a simple demand and supply model. How did the development of demand within the agricultural sector affect activity in all other sectors?
Before proceeding, we must note that Hoffmann's estimates of net value added in the arable section are not adequate as they stand for a close study of the relationship between current income in the sector and current effective demand. This is because, in his compilation of data on production and net value added he indiscriminately combines data for calendar years with data for the harvest year (July - June) which commenced during the given calendar year. The error is not material in respect of the production and net value added data in themselves; crops harvested in year 1925/6 are substantially those harvested in late summer 1925, I suppose. But the income derived from this crop does not constrain expenditure in calendar year 1925, but rather in 1925/6, or even later. A rough adjustment procedure which tries to reduce this problem of periodisation is outlined in Appendix VII pp 444ff. From now on, the revised data obtained there will be used in place of Hoffmann's; only where an estimate for 1925 is desired will Hoffmann's 'raw' data be used, since the method of revision eliminates this observation.

In the introduction to the chapter it was stated that the significance of agricultural demand for the behaviour of the economy as a whole largely depended on its being, to a significant degree, exogenously determined. The effective demand of the sector is a function on the one hand of its expectations, but on the other, of the constraints imposed by the income it earns and by the credit opportunities open to it. In the subsection which follows the pattern and the determination of agricultural

income flows over the quinquennium are considered; in the next subsection the distribution of this income between labour and capital, and the determinants thereof; thereafter the rate of borrowing by farm operators, and its determinants; and in the final subsection the determinants of short-term change in investment expenditure are examined.

9.2.2. Income Flows in Agriculture: the Trend 1925-29

According to Hoffmann's data, both revised and unrevised (to retain an estimate for 1925) the development of net value added in agriculture and in all other sectors at constant and current prices is as shown in Table 2.

Table 2 Net Value Added Mrd.Mk.

	Constant (1913) Prices		Current Prices		
	(1) Agric.	(2) All Other Sectors	(3) Agric. Hoffmann	(4) Agric. Revised	(5) All Other Sectors
1925	6.7	38.9	9.1	-	49.3
1926	6.4	37.3	8.9	9.4	48.7
1927	7.8	44.1	10.9	10.4	61.2
1928	8.3	44.6	11.7	11.3	66.9
1929	8.0	45.6	11.1	11.4	69.6
1930	8.7	41.6	10.6	10.7	63.3
Rates of Increase %					
1925-7	16	13	20	-	24
1925-9	20	17	22	-	40
1925-30	30	7	16	-	28
1927-9	3	3	2	11	14
1928-9 / 1925-6	24	18	27	21	39

SOURCES: Hoffmann ... op.cit. pp 319, 323, 455, 509.
Hoffmann (revised): Appendix VII p 447 .

For the examination of the behaviour of sectoral income as a constraint on effective demand, it is the development of net value added at current prices that is immediately relevant. From Table 2 we see that the quinquennial growth of this quantity was slower in agriculture than in all other sectors together *3. But, as the constant price part of the table indicates, this was not because of the slower growth of 'physical' output, but because of the slower increase in the returns per unit of output received by factors of production in agriculture than in other sectors. This difference is not at first sight expressed in the price indices (see Table 3).

Table 3 Selected Wholesale Price Indices (Two Year Averages)

	Agric. Commodities	Industrial R.M.+S.M.*	Internationally Determined R.M.+S.M.*	Industrial Finished Goods
1925-26	131	136	142	154
1928-29	132	131	130	158

Selected National Income Price Deflators (Two Year Averages)

	Foodstuffs	Domestic Services	Education, Recreation	Public Sector Current Expenditure
1925-26	142	136	136	136
1928-29	145	147	147	150

* R.M.+S.M. = Raw Materials and Semi-manufactures

SOURCES: Wholesale: Konj.stat.Hdb.(1936) pp 99-104.
Nat.Inc.Deflators: Hoffmann ... pp 600-601.

*3 Due almost entirely to the slow growth of the arable section: see Table 1 p 321 above.

The quinquennial change in wholesale prices of agricultural commodities is not appreciably different from that for industrial finished goods. But is is much less than that for labour-intensive services such as domestic services, public sector current expenditure, education, recreation. It maybe that the increase in the implicit deflator of net value added by the entire non-agricultural sector originates mainly in these service sectors. However, even though the price rise in industrial finished goods is slight, it seems possible to argue that the deflator of net value added by this sector also increased *4, especially when we remember that the above mentioned services were not only labour-intensive, but also sparing in the use of raw materials.

The price stability displayed by industrial finished goods is probably the result of offsetting trends: decline in the price of raw materials and semi-manufactures (especially those which are internationally determined) and rising productivity, matched by an increase in wage and salary costs. Agriculture, by contrast, was relatively light in the use of those (especially overseas) raw materials whose price collapsed in the later 1920s.

Similar price trends in agriculture and industry conceal therefore differing trends in factor returns. But was the slower growth of factor incomes in agriculture exogenously determined, or was it merely the reflex of the income inelasticity of domestic demand for the products of the sector?

Change in factor incomes is the result of change in quantity produced, change in price, and change in necessary costs such as materials,

*4 Cf. Hoffmann's data on volume of production in 'Gewerbe' (p 455 cols. 2-5) with that on income generated in 'Gewerbe' at current prices (p 508).

depreciation etc. I assume that in arable this last item can be ignored, but not in the livestock section. In the following I shall try to show that, over a quinquennium at least, quantity produced can be regarded as exogenously determined, thereafter that the determination of arable price contains at least significant elements of exogeneity; finally that the price determination of the major input of the livestock section - feedstuffs - is largely exogenous.

It seems a fairly well established theorem of agricultural economics that the supply of agricultural commodities is price inelastic in the short run *5. And in this context the 'short run' would, it seems, reasonably span a quinquennium *6. The inelasticity of supply can be illustrated in the case of selected arable crops by reference to the development of sown area and yield per hectare (see Table 4).

Table 4 Sown Area (Mill.ha.) and Yield per Hectare (Tonnes/ha.) Selected Crops

	Wheat		Rye		Potatoes		Sugar Beet	
	Area	Yield	Area	Yield	Area	Yield	Area	Yield
1920-4	1.4	1.8	4.3	1.4	2.7	12.9	0.39	23.9
1925	1.6	2.3	4.7	2.0	2.8	17.1	0.40	25.6
1926	1.6	1.8	4.7	1.6	2.8	12.5	0.40	26.1
1927	1.7	2.1	4.6	1.7	2.8	15.4	0.43	25.0
1928	1.7	2.4	4.7	2.0	2.8	15.9	0.45	24.2
1929	1.6	2.2	4.7	1.9	2.9	15.6	0.45	24.4
1930-2	2.1	2.2	4.5	1.8	2.7	18.0	0.38	30.0

SOURCE: Hoffmann ... pp 274, 281-2.

*5 D Gale Johnson, 'The Nature of the Supply Function for Agricultural Products'. See also Mark Nerlove, The Dynamics of Supply ... Nerlove finds considerable supply elasticity with respect to expected price, which he proxies by a distributed lag regression on actual past prices. The adjustment of supply within a quinquennium would therefore be slow. Moreover he finds total arable output less price elastic than output of individual commodities. See his summary pp 82-6.

*6 For this reason I infer that changes in stocks of arable produce have little effect on production decisions.

In the second half of 1920s yields were on average above those obtained in the first half, probably as a result of the progressive recuperation of the soil under fertilisers; but within the period 1925-29 there is no discernible trend in either sown acreage or yield. The latter is clearly a function of the weather. Contemporary comment tells us that the harvest in 1925 was exceedingly good *7, that in 1926 exceedingly poor *8; 1927 was better than 1926 in quantity but poor in quality *9; 1928 was in general a very good harvest; 1929 also good, if in quality not quite up to 1928 *10.

Table 5 Output of Livestock and Livestock Products

	Slaughterings (000 tonnes)		Livestock Output Constant (1913) Mill.Mks.	
	Pigs	Cattle and Calves	Meat	All Other
1924	1617	846	3770	-
1925	1661	889	3916	2605
1926	1740	904	4036	2658
1927	2086	882	4372	2890
1928	2270	994	4897	3044
1929	2076	1106	4823	3118
1930	2134	1047	4813	3213

SOURCE: Hoffmann ... pp 302, 310.

It seems plausible also to hypothesise that, within a quinquennium, the supply of livestock and of livestock products was also inelastic with

*7 Wd 10/2(1925), p 1428, 'Die Getreidebilanz des Erntejahrs 1925/6'.

*8 Wd 11/2(1926), p 1311, 'Die Getreideversorgung auf Grund der neuen Ernte'.

*9 Wd 12/2(1927), p 1484, 'Getreideversorgung auf Grund der neuen Ernte'.

*10 Wd 14/2(1929) p 1536, 'Das Erntejahr 1928/9 in Deutschland'.

respect to selling price.

As Table 1 demonstrates, livestock output showed a more pronounced tendency to increase than did arable: was it therefore simply related to current domestic demand for livestock products? That this was not so can be shown most clearly in the case of pigs, (the major type of livestock in Germany). Contemporaries recognised a 'corn-hog' - or rather a 'barley-hog' cycle *12. The analysis is not hard to reproduce if we chart the relationship between pig and barley (the main feedstuff) prices, together with the development of the pig stock and the rate of slaughtering.

Table 6a Data for the German 'Barley-Hog' Cycle
Price Index, or Mill.Beasts

	(1)Pig Price	(2)Barley Price	(3)Ratio Col(1)/Col(2)	(4)Pig Stock at 1.12 of previous year	No. of Slaughterings
1913	120	171	70	-	-
1924	164	204	80	-	10.2
1925	179	239	75	16.9	12.1
1926	193	215	90	16.2	13.1
1927	157	253	62	19.4	17.3
1928	162	264	62	22.9	19.5
1929	202	237*	85	20.1	17.3
1930	167	206	81	19.9	18.0

* Assuming error in Hoffmann, which here reads 327. (The correction brings this estimate in line with other evidence -eg that of St.Jb.f.d.Dt.R.)

SOURCES: Cols (1) and (2): Hoffmann ... pp 554, 559.
Cols (4) and (5): St.Jb.f.d.Dt.R. 1928 p 85, 1930 p 83, 1931 pp 71, 76.

*12 Esp. the Inst.f.Konj.forsch., following perhaps their American mentors - the NBER. See eg Vjh.Konj.forsch. 1926 H4 p 72, and many other places.
This cycle can be viewed as an inventory cycle in livestock.

Relative to 1913 the pig-barley price ratio was high in 1924-26. Pig producers exploited this initially by increasing slaughterings, but subsequently by increasing stock. As a result, supply of slaughtered animals jumped up in 1927, and, at the same time the barley price shot up. The disastrous price ratio of 1927-28 prompted a reduction in stocks, which meant an excess of slaughtering in those years. By 1929 barley prices were falling in common with world grain prices; this restored a favourable price relationship, and a cyclical upswing recommenced (at 1.12.30 the size of the pig stock was 23.4 mill.). The average weight of slaughtered beasts corroborates this thesis:

Table 6b Average Weight of Slaughtered Pigs in Kg.

Year	1924	1925	1926	1927	1928	1929
Weight	90	91	92	90	88	90

SOURCE: St.Jb.f.d.Dt.R., as for Table 6a.

Average weight increased when stocks were being built up (fewer young pigs slaughtered) and fell when stocks were being run down. Striking confirmation that the supply of pig products was 'exogenously' determined appears to be provided by the corresponding data for the U.S. 'corn-hog' cycle.

In the U.S., as in Germany, pig stock seems to conform to the pig-corn ratio after about a year's lag. The parallelism with the German data, in respect of price movements, pig stock and pig production is unmistakeable. To my knowledge the only common element was the barley price - presumably barley is a close substitute for corn; mutual trade in pig products was small.

Table 7 Data for the U.S. 'Corn-Hog' Cycle
Indices of Price or Physical Quantity

	Pig Price	Barley Price*	Corn Price	Pig/Corn Price Ratio	Pig Stock	Pig Production
1924	86	107	126	68	66	15
1925	124	87	82	151	56	14
1926	139	83	88	158	52	15
1927	113	100	101	112	56	16
1928	100	-	100	100	62	16
1929	111	78	95	117	59	15
1930					56	

* Harvest Year Price

SOURCE: Historical Statistics of the U.S. pp 289, 296-8.

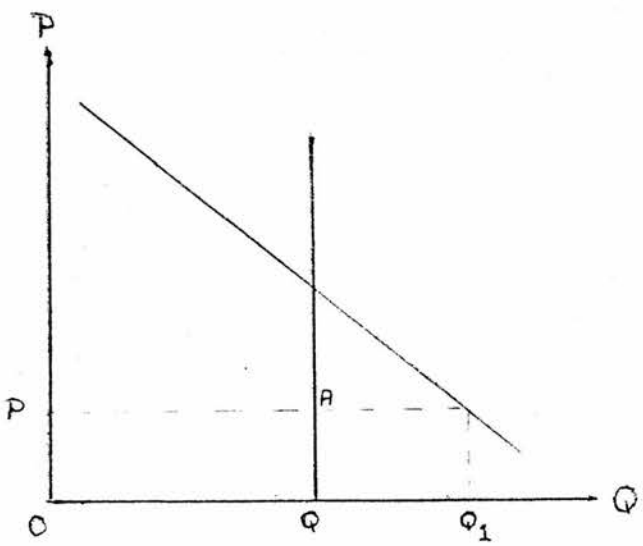
In fine, pig slaughterings were a function of the current ratio between the pig and the feedstuff price, and the size of the existing stock. In the short run they are only mediately a function of the pig price per se. The 'barley-pig' cycle dominated livestock production as a whole by virtue of the importance of pig rearing; a similar cycle cannot be shown to characterise other departments such as cattle rearing. However contemporaries did hold in this case that the availability of hay was as important a determinant of profitability as selling price. This influence is by its nature statistically less demonstrable than the pig cycle, but it was described in qualitative terms in the Vjh.Konj. forsch. *13.

Having attempted to show that the main determinants of agricultural supply were exogenous, I turn now to consider the determinants of

*13 This can be followed through the agricultural sections of successive issues 1927-29.

agricultural price. Firstly in the case of the arable section. If the price of arable commodities is purely determined by the interaction of domestic demand with the exogenously given supply, then arable receipts are in principle endogenously determined within the German economic system. And if input costs are negligible or rather constant *14, then income is endogenously determined too. But to a greater or lesser extent arable prices were internationally determined. The extreme case is wheat, the world market for which, up till 1929 was highly 'perfect'. Moreover, since Germany supplied only c.3% of world output and a correspondingly small proportion of internationally traded wheat, German influence on the world price was negligible *15. It is easy to verify that German and world wheat prices moved in close parallel *16.

The dynamics of the German wheat market can be approximated as follows *17:



DD is the domestic German demand for wheat. OQ is the exogenously determined domestic supply. OP is the internationally determined price. QQ_1 is the import of wheat required to clear the domestic market at the world price. The exogenously determined receipts of German wheat producers are given by OPAQ *18.

Diagram 9/I

*14 ~~cf Table 3 p above.~~

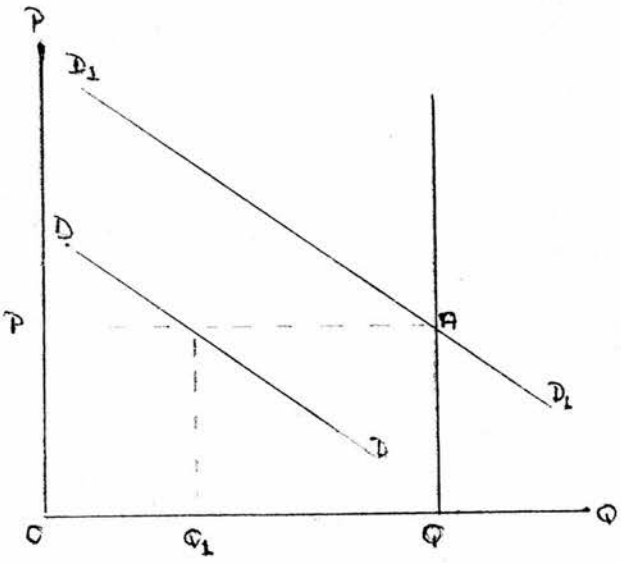
*15 E Malenbaum, The World Wheat Economy, pp 236-9.

*16 cf Hoffmann...p554, with B R Mitchell and P Deane, Abstract...p477.

*17 In the following analyses of arable prices it is assumed that since tariff levels were constant between summer 1925 and summer 1929, these can be ignored.

*18 In fact about half of German wheat consumption was imported during these years. See Konj.Stat.Hdb(1936) p 178.

Wheat is, however, an extreme case. But the analysis appears to hold in a modified form for rye. Germany was a major supplier of rye on the world market, especially since the absence of Russian supplies after the war. But supply is in any case exogenous in the short run; the critical assumption is that price in this case also is internationally determined and that changes in international demand for rye are largely independent of changes in domestic demand. Were Germany the only supplier of internationally traded rye the analysis would be:



In this case DD is the domestic demand for rye. D_1AD_1 is the international demand for rye. Price is internationally set at OP and this together with the exogenously given supply (OQ) determines receipts at PAQO. The export surplus Q_1Q is set by the displacement between the international and the domestic demand schedules *19.

Diagram 9/II

In this model the exogeneity of price determination is inversely related to the proportion of world demand accounted for by Germany itself. This proportion was probably fairly high *20, so we cannot conclude

*19 Net export of rye was only a small fraction of domestic production ... But exports plus imports of rye was more than 10% of domestic rye production, so that internationally traded rye had a significant impact on the domestic market. See Konj.Stat.Hdb(1936) p 178.

*20 In the 1920s Germany imported ¼ - ⅓ of all internationally traded rye: Wd 13/2(1928) pp 1546-7, 'Die Lage des Weltmarktes für Brotgetreide'.

more than that rye price was not wholly determined by the domestic market.

Fig.9/II and the related conclusions about the determination of rye price would also seem to apply to sugar beet, because at least 5% to 10% of beet output was exported. Potatoes were a crop in which Germany had a marginal import surplus *21; given low value-to-weight ratio of this crop it seems that the domestically determined price was much less subject to the constraints of the international market than in the cases previously mentioned.

Finally barley must be put in a class on its own. To some extent it probably falls between the models illustrated in Figs. 1 and 2. Like wheat, German and international barley prices moved in quite close parallel Furthermore, inasmuch as barley was chiefly used as a feedstuff, the domestic element in its price determination is a function of the size of the livestock, which as we have seen is exogenous in the short run.

It can therefore be concluded that the international market set, for most crops, reasonably narrow limits to the range of domestically engineered price fluctuation. It is a widely accepted generalisation that world prices of arable products were relatively low in the 1920s *23. The failure of factor incomes in the German arable sector to rise is therefore at least in part ascribable to adverse international market conditions. This type of analysis does not seem to be applicable to the livestock sector, where international markets were generally much less well

*21 Konj.Stat.Hdb.(1936) p 178.

*23 See the classic interpretation of W Arthur Lewis, Economic Survey 1919-39 pp 38-65. The high inter-substitutability of grains reinforces the argument.

developed. Livestock prices were therefore more purely determined by the interaction between the (in part exogenously set) domestic supply, and domestic demand. Particularly in pig rearing, income was low for much of the period under review; to the extent that this is related to an international pig-feedstuff cycle, this too was exogenous *24.

9.2.3. The Distribution of Income in Agriculture 1925-29

So much for the aggregate development of income: what of its distribution between hired labour and farm operators? The sources I rely on provide different approximations of this division.

Firstly, Hoffmann calculates aggregate labour income in the 'primary' sector (in cash and kind) directly, and derives capital income as a residual, given net value added. His labour income series for 1925-29 is the backward extrapolation of an estimate of aggregate labour income in 1938, which was derived from census material.

The extrapolation factors are weighted averages of official agricultural wage rates (Tariflohnsätze), weighted according to information in the said 1938 census. Whether wage rates do adequate duty for earnings in this context is hard to tell. I have recalculated the capital income

*24 In a detailed article in Weltwirtschaftliches Archiv 29 (1929) pp 16*ff, entitled 'Industrie und Landwirtschaft', K Lange reaches a conclusion which appears to run counter to mine: viz. that agricultural income is more dependent on industrial demand for agricultural products than vice versa. He bases his conclusion on the estimate that nearly 2/5 of agricultural produce is sold to the industrial population, whereas only 1/6 of industrial output is sold to agriculture. In my view his conclusion does not follow from these facts, at least in the context of short-run dependence within a quinquennium.

series, using my revision of Hoffmann's net value added statistics. Note that imputed labour income of farm operators and their families is here included under labour income. This is shown in Table 8a; in Table 8b I add Stat.Reichsamt estimates of cash earnings of farm operators.

Table 8a Distribution of Income in Agriculture
Mill.Mks. Current Prices

	(1)Net Value Added in AFF* (revised)	(2)Capital Income (a) Raw	(b) Revised	(3)Labour Income
1925	-	+793	-	9015
1926	9912	-342	+164	9748
1927	11048	+1313	+787	10261
1928	12018	+1418	+1036	10982
1929	12073	-251	+292	11781
1930	11234	-1127	-953	12187

* AFF = Agriculture, Forestry and Fishing.

SOURCES: Col (1): Appendix II p 447, (plus Forestry, Fishing)
Cols (2a) and (3): Hoffmann ... p 508.
Col(2b): Difference between cols (1) and (3).

Table 8b Cash Incomes of Farm Operators, Gross and Net of Interest Payments Current Prices Mill.Rm.

	1924/5	1925/6	1926/7	1927/8	1928/9	1929/30
Gross	2252	2451	1774	2145	3115	2877
Interest Payments	425	610	625	785	920	950
Net	1827	1841	1149	1369	2195	1727

SOURCE: St.Jb.f.d.Dt.R. 1936 p 509.

Both the 'raw' and the 'revised' data in Table 8a concur that capital income reached a peak in 1928; Table 8b however places the peak in cash earnings slightly later - 1928/9. It is notable that labour income increased by 30% between 1925-29, whereas net value added increased by only c.22%. Thus, according to Hoffmann's data, profits were being squeezed. This has a rational explanation if we consider evidence of labour income per occupied person in different sectors:

Table 9 Labour Income per Occupied Person Currant Mks.

	Agric. Forestry Fishing	Mining, Manufacturing, Services	Entire Economy
1925	920	1740	1680
1926	1020	1800	1750
1927	1020	1810	1900
1928	1160	2100	2000
1929	1260	2230	2140
Increase 1925-29	31%	25%	24%

SOURCE: Hoffmann ... pp 205-6, 508-9.

METHOD: Total annual labour income was divided by annual average employment in the same sector.

Employment in agriculture fell by c.2% between 1924-29; in mining, manufacturing and services it increased by c.10%. Labour income was at a lower level in agriculture than in other sectors, but rising faster. Integration of the labour market due to cultural change and transport development, perhaps also the halving of the agricultural labour immigration over the eastern frontiers compared with pre-war days *25 are

*25 W Köllmann, Bevölkerungsgeschichte, in Handbuch der deutschen Wirtschafts- und Sozialgeschichte (1976), Bd.2, p 36.

obvious reasons for this. The question of agricultural wages was a touchy subject as a controversy in Wirtschaftsdienst in the mid 1920s reveals *26.

The Stat.Reichsamt/Inst.f.Konj.forsch provide estimates of the cash earnings of farm operators, the cash wage bill of labourers, and of self-consumption on farms *26A. Inference from this source as to the distribution of income depends crucially on how one elects to divide self-consumption between labourers and operators. Suppose 50% to each. Then between 1925-29 labour income grew by 13%, operators'income by 16%. If self-consumption is divided between the two more nearly in accordance with the ratio of their aggregate cash incomes - ie in the ratio labourer:operator = 1:3 - then labour income increased by 17%, operator income by 12%. This source clearly does not yield definite conclusions.

9.2.4. Profitability of Agriculture

Profitability can be viewed from another angle. If my revised estimates of capital income in agriculture (Table 8a) are expressed as a proportion of the current value of the total capital stock (excluding land), an estimate of the rate of profit can be obtained. For comparison the same is done for mining, manufacturing, trade and commerce (Gewerbe), and the calculations are repeated for two previous four-year periods - 1910-13, and 1892-95.

*26 Wd 11/1(1926) pp 529, 778; 11/2(1926) p 993.

*26A St.Jb.f.d.Dt.R. 1936 p 509; Konj.Stat.Hdb.(1936) pp 175-7.

Table 10 Rates of Profit in Agriculture and 'Gewerbe': Four Year Average

	Agriculture Forestry, Fishing	'Gewerbe'
Capital Income 1926-29 Mrd Mk	2.3	19.0
Capital Stock* 1926-29 Mrd Mk	283.0	489.0
Rate of Profit 1926-29	0.8%	3.8%
Rate of Profit 1910-13	7.7%	7.3%
Rate of Profit 1892-95	6.4%	7.5%

* excluding land.

SOURCES: Capital Income in Agriculture 1926-29: Table 8a p 335.
All else: Hoffmann ... pp 255-6, 507-8.

If the degree of bias *27 in the capital stock estimates is the same in both sectors, the evidence of extremely low profitability in agriculture compared with that in Gewerbe is unmistakeable. Moreover, even allowing for considerable non-comparability between pre- and post-war capital stock estimates, the decline in the estimated profit rates in the primary sector (both absolutely and relatively to that in Gewerbe) is so extreme that it surely must reflect fact.

Evidence about the behaviour of profitability in agriculture can also be derived from the Agricultural Bookkeeping Survey (Landwirtschaftliche Buchführungsergebnisse) *28. Both the Stat.Reichsamt/Inst.f.Konj.forsch. and the sources used on by Hoffmann *29 rely to some extent on this

*27 See Appendix IV.

*28 Deutscher Landwirtschaftsrat, Fünfjährige Buchführungsergebnisse... This was conducted under the auspices of the 'Enquete-Auschuss'. See Wd 13/1(1928) p 52.

*29 Eg D Grupe, Die Nährungsmittelversorgung Deutschlands seit 1925.

survey. Hence none of the evidence cited here is wholly independent of any other. The Bookkeeping Survey comprehended only 0.3% of all agricultural enterprises, ie 3000 units *30, and was stratified as follows. Firstly geographically - between east and west Germany. Secondly by major type of crop - sugar beet, potatoes, bread grains and feedstuffs (presumably the livestock section of agriculture is subsumed under 'feedstuffs' and 'potatoes'). Thirdly by size of holding. All results were published on a per hectare basis, to aid comparability. Since the data is extensive, and I do not possess the weighting factors that would enable me to combine the estimates of the several subsamples, I have been unable to reproduce it.

From the Agricultural Bookkeeping Survey, net profitability can be calculated as a percentage of gross proceeds from sales plus self-consumption. Since circulating capital, broadly speaking, turns over once per year in agriculture, this can be viewed as a rate of profit on circulating capital; it therefore exaggerates the profit rate on the entire capital stock.

Apart from the fact that Table 11 is a percentage of turnover only, the following points should be borne in mind in interpreting it:

(1) The sample is small (0.3% of agricultural enterprises) and in many cases the sample variance is large. The means reproduced are therefore weakly attested *31.

*30 Max Sering et al., Die deutsche Landwirtschaft unter volks- und weltwirtschaftliche Gesichtspunkten ... p 39. According to Wd, loc.cit. in *28, the number was 5600.

*31 M Sering op.cit. p 39.

Table 11 Average Profitability of Agriculture 1924/5 - 1928/9
% per Hectare

East Germany

Size of Holding (ha.)	5-50	50-200	above 200
Sugar Beet Producers	8	5	3
Potato Producers	8	1.5	0.5
Grain Producers	5	0.5	-2
Feedstuff (Livestock) Producers	1	-1	-6

West Germany

Size of Holding (ha.)	5-20	20-100	above 100
Sugar Beet Producers	15	9	8
Potato Producers	13	6	4
Grain Producers	7	6	3
Feedstuff (Livestock) Producers	1	2	-0.5

NOTE: Profit defined net of imputed labour earnings of operators, and of land taxes, but gross of income taxes and interest charges.

SOURCE: Calculated as described from data in Deutscher Landwirtschaftsrat ... op.cit. appendix.

(2) Insofar as bias can be detected, it operates in offsetting direction. On the one hand it is usually believed that bookkeeping units in agriculture operated more efficiently than the average unit, so, that profitability would be higher on such *33. On the other hand, it is plausible to suppose that bookkeeping enterprises would follow 'best' accounting practice and enter depreciation allowances in excess of the economically justifiable, thus creating understatement of true profitability.

Therefore Table 11 provides a broadly unbiassed, but inexact picture of profit as a percent of turnover. We can infer that profitability as a percent of total capital employed was very low (or negative), that

*33 Wd 13/1(1928) p 52.

larger units were less profitable than small. (The evidence that profits were higher in the west than the east would to some extent be offset from the point of view of the individual operator by higher land prices).

9.2.5. Debt Accumulation in Agriculture

Agriculture reacted to this 'profitability crisis' not by reducing the margin of cultivation (see Table 4 p 326) but by borrowing.

Table 12 Agricultural Debt Statistics Mill.Mks. at 31.12.

	1925	1926	1927	1928	1929	1930
1 Long Term (Mortgage)	1011	2049	2814	3623	4117	4373
2 Medium Term	26	102	304	318	360	330
3 Short Term, formal	2186	2127	2568	2890	2865	3088
4 Short Term, informal	n a	n a	n a	n a	800	n a
Aggregate Lines 1-3	3223	4277	5684	6831	7262	7761

n a = not available. Formal short term debt: Certain bank credits and discounts.
Informal short term debt: other bank credits and trade credit.

SOURCES: Lines 1-3, 1925-28: Vjh.Konj.Forsch. 1929, H4A, p 19.
1929-30: proximate, M Sering op.cit. p 51
ultimate, Inst.f.Konj.forsch.

Line 4: Vjh.Konj.forsch. 1929 H2A, p 21.

Table 13 Agricultural Mortgage Credit Mrd.Mks. at 31.12.

Year	1924	1925	1926	1927	1928	1929	1930
Amount	1.05	1.55	2.51	3.19	3.98	4.35	4.55

SOURCE: St.Jb.f.d.Dt.R. 1931, p 354.

At a rough guess, total increase in agricultural debt owed to banking and other institutions between 1925 and 1929 was c.5.6mrd.Rm.
But how does the accumulation of debt by the sector compare with the savings generated within it? Was there a net transfer of resources from other sectors into agriculture? To gain a rough indication of this I compare the relationship between total capital income in agriculture and aggregate net investment in the same sector, with the relationship between the same two quantities in Gewerbe. The critical assumptions of this comparison are that (i) saving out of labour income in both sectors is exactly offset by consumer spending out of capital income, and (ii) that all borrowing is for purposes of productive investment.

Table 14 Capital Income and Net Investment Aggregated Estimates Mrd.Mks Current Prices 1925-9

Agriculture		'Gewerbe'	
Capital Income	Net Investment	Capital Income	Net Investment
2.9	4.1	21.6	19.3

SOURCE: Hoffmann ... pp 260, 508.

Whereas in Gewerbe net investment over the quinquennium is estimated to have been rather less than capital income, in agriculture (incl. forestry and fishing) it was estimated to have been more than one third

greater.

The evidence of institutional pressures points in the same direction. For most of German agriculture, an important source of finance was the agricultural cooperative movement, which was organised up till 1928 in two associations - the 'National Association' (Reichsverband) and the Raiffeisen Association. East Elbian Junkerdom found its long-term finance through the official Prussian 'Landschaften' (ie agricultural mortgage credit institutions). Finally, various other mortgage institutions and rural savings banks also lent to agriculture *34.
The National Association of Agric. Cooperatives (Reichsverband) and the Prussian Landschaften had a common clearing house in the Prussian Central Cooperative Clearing House (Preussenkasse for short) *35.
It was said that before the war this institution was self-financing, a pure clearing-house within agriculture, and only borrowing in the 'general' money market in certain seasons (eg before harvest). After the war the Preussenkasse became a heavy consistent borrower in the 'general' money market, as did the provincial (lower level) cooperative clearing houses (Zentralgenossenschaftskassen) *36. Since the war the Prussian State deposit in the Preussenkasse greatly exceeded the aggregate cooperative deposit, in stark contrast to the pre-war days *37.

*34 See W Prion, 'Organisation des deutschen Kapitalmarktes', E Grunfeld, 'Die Selbsthilfebanken'.

*35 Up to 1928 the 'Raiffeisen' association of cooperatives had a separate clearing house; thereafter the same. M Sering op.cit. pp 103, 105; Wd 13/2(1928) p 1587, 'Vereinheitlichung des ländlichen Genossenschaftwesens'.

*36 M Sering op.cit. pp 103-105, 613, 616-619.

*37 Ibid. pp 616-619.

In 1924-25 only c.25% of loans floated by the provincial central cooperative clearing houses (ie in Prussia) were subscribed to by the cooperatives themselves; in 1927 only 33%. Pre-war ratios had been much higher *38.

Furthermore, after 1925 the Preussenkasse was supplemented in its function by the Rentenbank Kreditanstalt (Credit Institution) - an offshoot of the Rentenbank which was chiefly used to ease agricultural financing *39. This brought considerable extra outside finance into the sector (see also below pp 360ff).

As final evidence in the same direction, we note that agriculture enjoyed considerable and continued government subsidies. These were granted for land improvement, to aid consolidation of holdings, and in connection with with the work creation programme of 1926-27.

Table 15 Reich Subventions to Agriculture and Industry Rm.Mill.

Years		Subsidies	Credits	Guarantees
1923-26	Mining. Mfg.	29	129	223
	Agriculture	-	1562	58
1927-28	Mining, Mfg.	180	-	15
	Agriculture	101	260	92

SOURCE: K. Hochdörffer, Die staatliche Subventionen in der Nachkriegszeit in Deutschland, p 98.

Statistical and contemporary evidence therefore strongly suggest net dissaving by agriculture. From the gap between capital formation and

*38 Ibid. p 112.

*39 Ibid. p 112; Wk 9(1930) p 160ff, 'Subventionen in der Landwirtschaft'.

capital income, this net dissaving may have been perhaps 3-4% of agricultural income - ie 1-2% of national income. In a Keynesian framework this 1-2% would provide a stimulus to aggregate demand of similar or somewhat greater magnitude.

9.2.6. Rationale of Net Dissaving

Assuming the conclusion of the last section, why did agriculture so persistently dissave? We are concerned with dissaving by enterprises, by farm operators, not by consumers. (It is to the former kind of debt that our evidence refers *42).

Which enterprises borrowed?

Clearly at all sizes of farm, debt burdens were lower relative to land values in the west than in the east. Actually, absolute debt levels in marks per hectare were comparable *43, but land values were higher in the west.

The scatter of debt burdens portrays the same picture. A much higher proportion of enterprises in the east than in the west was 'over the ears' in debt. Table 17 illustrates this for a selection of regions.

*42 A criticism of agricultural debt statistics occurs in Wd 13/1 (1928) pp 1016ff, 'Statistik der landwirtschaftlichen Verschuldung'. The article describes offsetting biasses however, with no indication that the incidence of bias was systematically related to region or size of enterprise. It may be well however to suppose that these statistics contain generally a degree of over-statement. For a discussion of agricultural debt in general, see F Beckmann, 'Landwirtschaftliche Kreditfragen'.

*43 M Sering op.cit. p 53.

Table 16 Aggregate Debt as a % of Land Values at 1.7.29 by Size and Region of Enterprise

Size (hectares)	5 -20	20 -50	50 100	100 -200	200 -400	above 400	ave-rage
East Prussia	-	68	64	79	76	68	69
Silesia	37	37	52	56	57	61	45
Mid-east provinces	59	47	57	73	71	57	59
Central Germany	26	28	34	39	48	-	31
North-West Germany	31	33	34	42	43	-	33
Rhinel.-Westph.	28	31	35	42	-	-	30
Bavaria	43	34	41	-	-	-	40

SOURCE: M Sering, op.cit. p 53.

Table 17 Distribution of Agricultural Enterprises by Size of Unit and by Aggregate Indebtedness as % of Value of Holding

Debt as % of Value of Holding	0 -30	31 -60	61 -100	above 100	0 -30	30 -60	61 -100	above 100
Size of Holding (Hectares)	EAST PRUSSIA				MID-EAST PRUSSIAN PROVINCES			
5- 50	17%	28%	29%	26%	39%	26%	17%	18%
50-200	13%	32%	30%	25%	23%	23%	25%	29%
above 200	10%	27%	38%	25%	15%	37%	29%	19%
	NORTH-WEST GERMANY				CENTRAL GERMANY			
5-50	57%	23%	11%	9%	63%	21%	13%	3%
50-200	53%	30%	12%	5%	60%	27%	11%	5%
above 200	34%	42%	22%	2%	35%	35%	20%	10%
	RHINELAND AND SOUTH-WEST GERMANY							
5- 50	61%	20%	17%	2%				
50-200	64%	19%	11%	6%				

SOURCE: M Sering op.cit. p 54.

In the bulk of enterprises in west and central Germany, the debt burden was less than half the value of the holding. By contrast in the east the debt burden of the bulk of holdings exceeded 61% of the value of the holding.

It is also broadly true in all regions that relative debt burdens were higher, the larger the holding. Thus debt burdens were above all a problem for large east German grain estates. This is the case, although profitability was probably not much lower in the east than the west. The geographical distribution of the debt may well provide the clue to its rationale.

A number of purely 'economic' explanations seem unsatisfactory. For example, a time-lag in adjusting from inflation-period prosperity *44 to post-stabilisation insolvency. The lag that this explanation would require seems implausibly long, although it is true that in agriculture random factors can obscure perception of the trend for longer than in other sectors; moreover this explanation would not account for the geographical and size distribution. Another 'economic' explanation would be to say that debt levels were returning to 'normal' after their abnormally low post-inflation level. This explanation is only rational however if the new debt was expected to earn a return in excess of the interest due; a condition which ex post was never met. Furthermore, already by 1927 it is believed that interest levels exceeded the 1913

*44 For inflation period prosperity see F Aeroboe, Der Einfluss des Krieges auf die landwirtschaftliche Produktion in Deutschland, pp 113-40. Debt and tax burdens were obliterated (the latter because of the c.1 yr. lag between assessment and payment, in the case of the sector), and the costs of labour, raw materials and equipment lagged well behind agricultural prices (though in fact agric. wages did not fall as much as non-agric. wages - because of the 'in kind' element.)

level *45.

The regional distributinn of the debt suggests a more plausible politico-economic explanation. Eastern grain estates should not be viewed merely as capital assets, but also as consumer durables. Possession of them was necessary to the 'way of life' and self-understanding of the Junker or would-be Junker. This is typified by the 'Hindenburg Spende' of 1927 in which the nation (by free subscription) bought back for him the estate of his forbears *46. Thus an estate would be maintained in being even under the expectation of several years' insolvency for the same reasons as, according to the 'permanent income hypothesis', a consumer adjusts his consumption according to his expected permanent income, irrespective of current negative transitory income.

But on what grounds did the East Elbian gentry regard the current insolvency as transitory? If we take at face value the prevalent interpretation of the political role of the Junkers, a rationale can be found. The Junker class traditionally exerted a lot of leverage on the Prussian bureaucracy and the Prussian government; hance also on the bureaucracy and government of the German empire *47. Political institutions had of course changed radically - at least to outward appearances - since the 'revolution' of 1919/19. But much modern political historiography of the 1920s aims to show that the realities of the power and the prestige of the Junkers had not greatly diminished in the republic, despite their

*45 See Table 19 p 353 below.

*46 J Wheeler Bennet, Hindenburg, The Wooden Titan, pp 312ff.

*47 H Rosenberg, 'Die Pseudodemokratisierung der Rittergutsbesitzerklasse', pp 287ff; W Carr, A History of Germany 1815-1945, p 140.

refusal to acknowledge its legitimacy *48. Having thus access to the 'corridors of power' the Junker reposed faith in the willingness of the state to support his economy. His faith was not in vain. Agriculture (ie chiefly eastern agriculture) received the bulk of economic subsidies in the mid 1920s *49. Heavy industry was, significantly, the other major recipient. Aid culminated in the notorious Osthilfe made available by various legislative/administrative acts of 1929-31 *50. Aid also came, if less clearly, in the form of tariffs. In 1925 the von Bülow grain tariffs of 1902/06 were reimposed with little alteration. Import certificates were reintroduced in October 1925 *51. What had been a high tariff before the war was perhaps less adequate in 1925, when prices were on average c.30% higher; and in addition livestock and animal product tariffs were actually raised above their pre-war levels in that year. Thus, the 1925 tariff was not specifically in the interests of the east.

In 1929-30 grain tariffs were approximately doubled *52; by 1931 they stood at about eight times their 1925 level (and their 1913 level). By 1931 livestock tariffs stood at 3 to 4½ times their 1913 levels, animal

*48 H Rosenberg op.cit. pp 306ff. A Gerschenkron, Bread and Democracy in Germany, pp 126ff; C-D Krohn, Stabilisierung und ökonomische Interessen, passim.

*49 For a detailed description see Wk 9(1930) pp 157ff, 'Subventionen in der Landwirtschaft'. Aid in the form of easing of payment terms on fertilisers, freight charges and other attempts to improve agricultural liquidity began as early as the 1924 harvest: See F Aereboe, Der Einfluss ... pp 186ff.

*50 See the Wk article cited in *49 pp 162ff.

*51 Wd 11/2(1926) p 955, 'Die neue Getreidezollregelung'.

*52 M Sering op.cit. pp 853-855.

product tariffs at only 1½ to 2½ times those levels *53. In addition Vermahlungszwang was introduced in flour-milling - ie millers were compelled to use a proportion of domestic grain *54. The state began to purchase surplus rye, dye it, and sell it as a feedstuff at a loss (eosinierte Roggen) *55. Finally, no sector received so much cheap government credit as did agriculture. This is described on pp 360ff. below *56. If therefore the theory of the political function of the Junker class is correct - a theory which stresses the material self-interest that governed their lobbying - then it seems that this debt accumulation represents its projection on the economic plane.
Other sections of agriculture probably perceived their position and self-interest in terms suggested by the propaganda of the Junker agrarian organisations *57. The more modest dissaving of these other sections would be consistent with this.

9.2.7. The Dynamics of Debt Accumulation

This section forms a transition from consideration of budget constraints

*53 Ibid. pp 832, 840.

*54 Wd 14/2(1929) p 1141, 'Die Neuordnung der Getreidewirtschaft'.

*55 Wd 15/1(1930) p46,'Die Neuordnung der deutschen Getreidewirtschaft'.

*56 Other minor aid included a 6 mill.mk interest rate subsidy on land improvement credits. Wd 12/2(1926) p1328. Also, (according to DV 11/1/29 p453) the purchase of east German estates by Prussia under the aegis of resettlement schemes) to maintain prices.

*57 H-J Puhle, Agrarische Interessenpolitik und preussischer Konservatismus, pp 143ff.

over the entire quinquennium, to the consideration of these constraints in the short run.

As long as there is no change in government policy, and underlying profitability shows little increase, borrowing must obviously increase at an exponential rate if farm operators' cash disposable income, net of interest payments, is to be sustained.

Available evidence suggests that already by 1927-28 agricultural debt was creating something of a crisis. This is clear from contemporary comment *58, but also from the fact that the Reich and Prussia initiated agricultural debt consolidation programmes in the summer of 1928, to which they devoted 18.5 mill.Rm. of their own funds plus the proceeds of a $25 mill. U.S. loan floated by the Deutsche Landesbankzentrale; a further 50 mill.Rm. was committed to this use in May 1929 *59. Perhaps the clearest evidence of growing crisis in agriculture was in the bankruptcy sales or land foreclosures, shown in Table 18.

In aggregate the table presents a picture of steep increase from financial year (April-March) 1924/5 to 1926/7. A plateau is then maintained till late 1927/8. Between 1927/8 and 1928/9 bankruptcy of smaller estates jumps up; not till 1928/9 - 1929/30 does bankruptcy in the largest class rise notably again.

By way of comparison it can be roughly estimated that in 1913/4 less

*58 Wd 13/1(1928) p 253, 'Zur Agrarkrise'; ibid. p 303, 'Das Notprogramm der Reichsregierung'; ibid. p 471, 'Reichsbeteiligung an der Agrarkredit'; especially ibid. p 1013, 'Zur Agrarkrise'; 14/1(1929) p 544, 'Ein Programm gegen die Agrarkrise'.

*59 M Sering op.cit. pp 674, 676.

Table 18 Bankruptcy Sales of Agricultural and Forestry Estates in most of Germany (Estates under 2 ha, excluded)
Number of Estates/thousand hectares

	Aggregate		Estates 2 - 20 ha.		Estates 20-200 ha.		Estates above 200 ha.	
	No.	Area	No.	Area	No.	Area	No.	Area
1924/5*	96	2	82	1	12	1	2	1
1925/6	308	9	248	2	51	3	9	5
1926/7	851	35	596	4	213	12	42	19
1927/8	913	37	658	4	207	13	48	20
1928/9.	1374	50	992	7	328	20	54	23
April/ Sept 1928	919	23	340	2	114	8	31	12
April/ Sept 1929	1329	48	478	4	229	15	58	29

* The 'year' is April-March.

SOURCE: Vjh.Konj.forsch. 1929 H4A p 19.

than 30000 ha, were foreclosed in the German empire *60. (1913 was of course a prosperous year). But by 1928/9 it is likely that the level of foreclosures had shot well above pre-war levels.

As a further aspect of the dynamics of debt accumulation it is interesting to compare aggregate income of farm operators (labour earnings and profit) gross and net of interest payments *61. It is clear that operators' incomes gross of interest payments tended to rise 1924/5 to 1928/9.

*60 Vjh.Konj.forsch. 1929 H4A p 19. Bankruptcy sales affected 26000ha. in Prussia in July-Sept 1929; 29000 ha. in the entire Reich during the same period. In the whole year 1913 bankruptcy sales in Prussia affected 22000 ha. For similar data see Wd 13/1(1928) p 253, 'Zur Krise der Landwirtschaft'. Foreclosure had practically ceased during the inflation.

*61 Deutscher Landwirtschaftsrat loc.cit.

But net of interest there is no discernible trend. In 13 out of the 24 subsamples it remains roughly static, in 6 it rises and in 5 it falls. Small-sized holdings dominate the 'rising' class, large-size holdings the 'falling' class. However between 1927/8 and 1929/9 alone, there is a rising tendency.

It seems justifiable to conclude that behind the increasing agricultural difficulties of the later 1920s there was a basic problem of growing indebtedness.

Finally, let us consider the evidence of aggregate interest payments, shown in Table 19.

Table 19 Aggregate Interest Payments by Agricultural Enterprises Mill.Mks. Current Prices

	(i) Sering Estimate		(ii) Stat. Reichsamt Estimate
1913	750		-
		1924/25	425
		1925/26	610
		1926/27	625
1927	880	1927/28	785
1928	915	1928/29	920
1929	965	1929/30	950

SOURCES: (i) M Sering op.cit. p 51 (ult. source - Inst.f.Konj.forsch).
(ii) St.Jb.f.d.dt.R. 1936 p 509.

The increasing interest burden therefore points in the same direction. Contemporaries however stressed the liquidity problem as much as the aggregate debt burden: the higher proportion of short term debt. Thus, Sering wrote, for this reason the average ratio of debt to assets on foreclosed estates after the stabilisation was actually lower than before the war, although in the later period the number of foreclosures was

much higher. The crisis developed from 1927/8, as the tolerance of short-term bank and trade creditors diminished *62. Maybe this is why bankruptcy increased earliest among smaller holdings at this time. Therefore to understand the foreclosure pattern we should perhaps concentrate on the short-term debt pattern (Table 12 p341). During 1926 and early 1927 the easy capital market conditions allowed a considerable consolidation of the short term debt incurred during 1924-25. In later 1927 this facility disappeared; agriculture was thrown back on short-term debt which increased for the first time since 1925. But interest rates were rising, and other general evidence tells us that trade credit was getting much tighter *63. The data underlying Table 18 show that foreclosures were beginning to jump up from the first quarter of 1928. Concern as to the liquidity problem obviously underlay the Reich/Prussian debt consolidation programme of 1928 *64. Finally it is to be noted that the increase in foreclosures persisted despite the record earnings from the 1928 harvest, and the improvement in livestock conditions. Solvency in agriculture was dominated by the debt burden to the exclusion of current change in income.

9.2.8. Short Run Change in Agricultural Demand

This section will concentrate on year-to-year change in agricultural

*62 M Sering op.cit. pp 57-58. See also Wd 14/1(1929) p544, 'Die Zinsbelastung'.

*63 See p 42ff above.

*64 A good description of the beginnings of this development is in Wd 12/2(1927) p1316, 'Vorsorge für die Erntefinanzierung'.

demand for producer goods. Demand for consumer goods can be assumed to have been more stable, though, even here there are indications of a 'dullness' in rural textile sales in early 1928 *65.

Table 20 provides major data on sales of producer goods to agriculture.

Table 20 Agricultural Purchases of Producer Goods Mill.Mk.
Current Prices Harvest or Calendar Year

	1924/5	1925/6	1926/7	1927/8	1928/9	1929/30
	1924	1925	1926	1927	1928	1929
1 New Buildings	231	325	351	405	384	366
2 New Equipment	272	204	241	303	281	242
3 New Buildings	90	170	270	300	360	340
4 New Equipment	180	210	210	250	260	240
5 Fertilisers	631	622	723	690	775	768
6 Fuels etc.	259	270	264	279	303	309
7 Feedstuffs	763	882	1495	1786	1726	1815

SOURCES: Lines 1,2,5,6,6: St.Jb.f.d.Dt.R. 1936 p 509.
Lines 3,4: Hoffmann ... p 237.

Hoffmann's data in lines 3 and 4 differ from the Stat.Jb. data probably mainly because of adjustment to a calendar year basis, and because he recalculated the depreciation allowances *66.

Lines 1 to 4 clearly identify a turning point in calendar year 1928 at the latest. In line 5 (fertilisers) the change is not regular, but 1928/9 is a peak. Line 6 (fuels etc.) show no turning point whereas line 7 (feedstuffs) follows closely the size of the livestock.

*65 Textilwoche 23/3/28 p 40, 'Landwirtschaftliche Krise und Not des Einzelhandels'; 7/9/28 p 7, 'Gebremster Konjunkturrückgang'; 16/11/28 p 12, 'Geschäftslage'; 30/11/28 p 12, 'Keine Konjunkturrückgang'.

*66 (See the chapter on fixed investment p 242).

Therefore on major investment items a turning point contemporaneous with that in the private non-agricultural sector (Gewerbe) is indicated. New orders for agricultural machinery reached a peak in the third quarter of 1927, at the same time as *67, or even earlier than *68 the aggregate domestic new machinery orders index.

Investment activity could have peaked in 1928 because of technical satiation of demand. Considering the low levels of equipment in German agriculture at the time *69 it seems to me that this explanation can be rejected. Rather I think we must consider the development of the income and borrowing constraints on effective demand. But from Tables 8a and 8b it is not easy to relate this to the development of farm operators' incomes. Rather it seems likely to have been a reflection of their deteriorating capital position, witnessed to by the rising bankruptcy statistics.

9.3. Feedbacks

The purpose of this section is to register a major qualification to the argument of the previous section.

*67 Konj.Stat.Hdb.(1936) p 228) The source material used by these two
) references is the same; presumably
*68 Maschinenbau 10(5/3/31) pW50) the witness of the Konj.Stat.Hdb. is to be preferred, as later.

*69 M Rolfes, in Hdb. der deutschen Wirtschafts- und Sozial-Geschichte Vol 2, pp 757-8.

9.3.1. It has been hypothesised above that both the state of the international market for agricultural commodities and also, to some extent the complex dynamics of the 'barley-pig' cycle conspired to depress factor earnings in agriculture. Given that labour earnings in the sector were sensitive to labour earnings in other sectors, the pressure fell chiefly on capital earnings. This would tend to depress the income constraint on the demand exercised by farm operators for the output of the non-agricultural sector. For a period, farm operators evaded this constraint by borrowing, but from 1928 this proved no longer possible. This is only part of the story, because we need to consider two types of feedback effects.

Firstly, what farm operators lost, the consumers of agricultural commodities gained in lower prices. Hence the depression of agricultural incomes is purely a transfer effect. This conclusion depends critically on the assumption that agricultural supply is price-inelastic over the period of a quinquennium. Had low prices caused a speedy reduction in output and employment in agriculture, the multiplier effects of this might have offset the transfer effects just outlined. But, as it is, agricultural supply is not reduced (in the short run) by low prices; is there any reason to suppose that low agricultural prices will reduce supply in the non-agricultural sectors? Given the income inelasticity of demand for agricultural products, low prices will create increased demand on the part of non-agricultural consumers for non-agricultural output. And the argument of section 3 of the chapter is that the reduction of demand on the part of farm operators, on whom the brunt of the low prices fell, was small, because they borrowed in order to maintain customary standards of expenditure. Thus, it is reasonable to conclude that the agricultural depression, far from reducing the aggregate supply

of commodities, more probably increased it somewhat, by contrast with a situation where, for example, agriculture enjoyed relatively higher prices, because of higher tariffs or a lower exchange rate *70. Three possible objections to this view are as follows :

i) To the extent that lower prices were being received on exports, there was genuine loss to the entire economy. In fact however Germany was a heavy net importer of agricultural commodities. So terms of trade which favoured industrial goods in exchange with agricultural goods could only benefit the economy as a whole.

ii) The response of the disadvantaged in depressing incomes is asymmetrically greater than the response of the beneficiaries in raising their effective demand *71. As already argued however in this case the opposite appears to be true.

iii) The dynamic adjustment to falling prices depresses expectations of both losers and gainers so that the static transfer effects are overwhelmed *72. However, up to 1929 farm incomes were low, but not falling, so this argument is irrelevant.

I find therefore the paradoxical conclusion hard to avoid, that the - to some extent exogenously determined - low level of farm incomes raised rather than reduced aggregate demand in the economy because it must have raised effective demand in other sections of the economy by more than

*70 As a matter of fact, poor harvests in 1926-27 coincided with high and rising levels of activity in other sectors; whereas a bumper harvest in 1928 coincided with declining incomes in other sectors.

*71 C P Kindleberger, The World in Depression p 142.

*72 Ibid. loc.cit.

it reduced it within agriculture. But this provisional conclusion leads to the second feedback which must be considered.

9.3.2. The second major type of feedback is the effect of net dissaving by the agricultural sector on the general level of interest rates, and hence on aggregate economic activity. It was suggested on p 345 above that during 1924-29 net dissaving by agriculture may have equalled 1% of national income, or 5% of net new financing *72A - not insignificant sums. A theoretical consensus creates the expectation that such net dissaving would cause higher interest rates, provided that the money supply was not directly responsive to agricultural credit requirements. The argument is as follows:

Let us assume that the credit is created within the banking sector, but that the authorities controlling the issue of 'base money' do not alter the money supply specifically in response to agricultural borrowing. The credit thus created will cause an increase in the total money supply. But this will mean a relative shrinkage of the cash base. Neglecting the extreme position of eg. the 'Radcliffe Committee Report', it can be accepted that this will reduce the ultimate liquidity of the banking sector and cause interest rates to rise; this will tend to depress investment, maybe personal and governmental consumption to a certain extent. While therefore the readiness and ability of agriculture to dissave does imply a net boost to aggregate demand (by contrast with the situation where its income had been the same, but the sector had not

*72A For statistics of net new financing see Hoffmann ... pp 508, 813.

borrowed), this net boost will have a partial offset in the induced reduction of investment spending etc in other sectors. Only in exceptional circumstances would the offset be total; though it must be remembered that in this period money conditions were exceptionally tight, for reasons unrelated to agricultural dissaving.

But one basic presupposition of the foregoing argument is shot through with exceptions. The money supply did in fact expand specifically in response to agricultural credit needs. To this extent, the 'negative feedback' would be mitigated. The supply expanded in the following ways:

i) The institution of the Rentenbank Kreditanstalt. This meant a prolongation of the life of the Rentenbank, and, more generally of its money-creating ability, beyond what was originally envisaged. The decision to prolong it was more or less directly a result of the experience of the agricultural credit crisis of 1924; during that year the Rentenbank lent 600 mill Rentenmark (= Reichsmark) to agriculture and its agencies (chiefly the Preussenkasse). When it became apparent that this could not be repaid as speedily as the Dawes experts had envisaged, the Rentenbank Kreditanstalt was set up to manage and in fact supplement these credits, by lending to a range of agricultural credit institutions *73.

ii) The Golddiskontbank. Originally this was set up to facilitate foreign trade in the immediate post-stabilisation period, before transition to a gold-exchange currency. Its life, too, was prolonged, in this case to act as an unofficial agency of the Reichsbank,

*73 M Sering op.cit. pp 106-111.

able to conduct business forbidden to the latter under its charter. For example, in 1926 the Golddiskontbank bought 240 mill.Rm. of mortgage certificates (Hypothekenschuldscheine) to aid harvest financing *74.

iii) In the summer of 1926 also the Reichsbank relaxed its re-discounting rules specifically in order to facilitate the financing of the harvest *75.

iv) The Government programme of agricultural debt consolidation 1928-29 (see p 351 above) can be viewed as a species of money creation, insofar as it was designed to improve the liquidity of the agricultural banking sector *76. Under the same action the government also sponsored an overseas loan by the Deutsche Landesbankzentrale, of $25 mill. (ibid.) This followed an overseas loan flotation of similar size and for a similar purpose by the Rentenbank Kreditanstalt *77.

v) New methods of agricultural short term credit - enjoying some measure of government guarantee - were introduced in 1928 on the basis of fixed delivery contracts for corn between farm operators

*74 To purchase these certificates the bank sold 'Solawechsel' to various public authorities with large cash balances. To the extent that these authorities themselves would not have been willing to purchase such certificates, because of their strong liquidity preference (see p 31 ff above), this practice reduced the sensitivity of the interest rate to agricultural borrowing. See E-A V/1, Die Reichsbank pp 115ff (Schacht's views on p 148); Centralverband ... Materialien ... p 23.

*75 M Sering op.cit. p 433. It was intended to rediscount the bills of flour millers. This flurry of aid to harvest financing in 1926 followed the extreme difficulty of financing the 1925 harvest. Under the easy monetary conditions of 1926 however it proved largely unnecessary.

*76 Ibid. pp 55, 674.

*77 In 1927 the Golddiskontbank also borrowed 30 mill.Rm. discount credit for agriculture: Wd 12/2(1927) p 1326.

and cooperatives *78.

That the money supply was in some measure directly responsive to the large credit demands of agriculture, is clear. What the net quantitative effect of this was on interest rates and hence on economic activity could not be determined without a macro-econometric model. Perhaps this much may be suggested however: the most significant acts of responsive money creation came in the period 1924-26 *79. Thus, maybe at the very time when the inner dynamics of the agricultural sector were generating a crisis, the monetary response of the authorities was drying up, so that the feedbacks of net agricultural dissaving on the rest of the economy (via higher interest rates) would be more pronounced. But again, this is impossible to quantify.

9.4. Conclusion

Thus, in this chapter, I have tried to show that the lack of prosperity in agriculture did not restrict agricultural spending; rather it induced

*78 M Sering op.cit. p 432. Further less important measures of this kind include: the fact that the Advisory Council for Foreign Credits relaxed its rule that local circumstances were not a relevant criterion of the admissibility of foreign credits, only in the case of a number of agricultural (specifically eastern) and agricultural/border local authorities. This follows from analysis of the applications in BA R2/2126-2130.

*79 Harvest financing continued throughout the period, but on a more modest scale: DV 2/8/29 p 1496, 'Aus der Woche'.

dissaving. Inasmuch as (i) within arable, the low incomes were exogenously induced (from international influences) and (ii) because agricultural supply was inelastic, quantity of real product generated in the sector did not fall, so that, (iii) the only direct effect of the low agricultural prices was to transfer income to the rest of the economy, this net dissaving represented a net Keynesian stimulus to aggregate demand. This would be offset to the extent that the dissaving was financed from borrowing from the banking sector which raised interest rates to the economy as a whole, hence causing reductions in investment spending in other sectors. But even this feedback was emasculated, especially in earlier years, by net money or credit creation by the monetary authorities, specifically to meet agricultural needs.

From 1927-28 a liquidity crisis began to engulf agriculture, especially in the east, as a consequence of the rapid rate of prior debt accumulation, and of the general deterioration of financial markets; this seems to be the most plausible explanation of the decline in the sector's purchases of investment goods from 1928.

CHAPTER 10 CONCLUSION

To conclude this thesis I return to the question proposed on the first page. Was the depression in Germany produced by the impact of a strong 'exogenous' shock on a stable economic system, or of a more moderate shock on an unstable system? The first five chapters, and the seventh, have an especial bearing on this issue. I have hypothesised that the inflation reduced economic stability, by comparison with the pre-war period. Firstly, it had an effect on the overall savings ratio. The experience of the inflation seems to have reduced households' propensity to save *1. The momentum of inflationary wage claims seems to have persisted after the stabilisation; given a fixed exchange rate, this circumscribed business saving *2. For a number of socio-political reasons, government saving was little greater than before the war *3. Thus, overall, the propensity to save was less; hence, at given levels of 'autonomous' (public sector, private investment) expenditure and export demand, the external current account balance would be worse. This deterioration in the external balance is, of course, observable in the statistics of the period.

The weakness of the external balance, and the wage/price drift prompted a restrictive monetary policy right from 1924 on the part of the Reichsbank.

*1 Chapter 5 pp 135-142 .

*2 Chapter 5 pp 149ff and Chapter 8 pp 307ff .

*3 Chapter 5 p 135 and Chapter 4.

The extensive, often compulsory wage negotiating and arbitrating machinery may be viewed as having exercised a joint function with the monetary policy, in preserving the stability of the currency, and thereby, of the bourgeois state *4.

Contrary to what might have been expected, this deterioration in the goods and services balance did not induce foreign exchange difficulties. This can, following Hardach, be partly ascribed to the success of the restrictive monetary policy in attracting short term funds, but a fuller understanding of the process is gained from a consideration of the effects of the inflation on the capital market. Not unnaturally, it seems to have weakened the domestic propensity to hold German bonds, both as a direct consequence, and also because it seems to have reduced turnover on the stock market, and made it more variable, thus increasing the volatility of security prices and hence the risk of holding them. Foreigners' propensity to hold German bonds did not deteriorate, by comparison with pre-war, so severely as did the domestic propensity. This is evident ex post from the fact that, in contrast to pre-war, foreigners came to be considerable net holders of the German bond stock. The process whereby they accumulated this portfolio substantially alleviated the German Balance of Payments in the period under review. The reason why foreign aversion to German bonds did not increase at the same rate as domestic may be found firstly in the fact that short rates were generally lower abroad (in virtue of generally easier monetary policies abroad). Secondly, in the fact that German bonds normally constituted a smaller proportion of the total bond portfolios of foreigners than of Germans; they could diversify their risks better *5.

*4 Ch 2 and Ch 5 p.154. This supports the conclusions of G Hardach, H-H Hartwich and Helmut Müller (see citations in pages referred to).

*5 See Ch 3 esp pp 79 ff.

Such a method of balancing her international accounts would not necessarily have posed a threat to the stability of the German economy, had it not been for the excessively short maturity distribution of the debt obligations Germans incurred. The ratinnale of this distribution from the viewpoint of these who held the debt has often been noted: the desire to minimise risk. But probably those incurring the debt were equally eager that it be short debt, because they looked forward to the rapid normalisation of interest rates and hence were unwilling to saddle themselves for long future periods with debt bearing the high current rates. Both these demand and supply side factors seem necessary to account for the oft-noted avidity with which Germany built up a high level of short term indebtedness in the 1920s, and which ended in the debacle of 1931 *6.

This short maturity distribution characterised the domestic debt structure also. Both in 1925, and again in 1928 there are signs that it created grave illiquidity in the economy, in times when expectations were deteriorating. The short maturity distribution seems to me a major element in the short run instability of the economy.

Before closing this account of the features which 'set the scene' for the domestic instability in Germany 1924-29, I must note one other, little related to those already described: the inventory cycle. It seems plausible that business stocks were emptied by the frenetic final months of the inflation and that this exogenous stimulus, like a hand pulling a pendulum away from the neighbourhood of equilibrium, then releasing it, set in motion a 'Metzlerian' inventory cycle which dominated short run macro-economic change (in the sense that movement of this variable

*6 Chapter 3 p. 49 .

absolutely exceeded all others) up to early 1927. But, accepting the findings of modern research as to the weakness of the short-run 'multiplier', and the comparative flexibility of orders and production lags, it seems likely that this inventory cycle would be a highly damped one; my revision of the constant price inventory investment data indicates that in the period 1927-29 it no longer dominated macro-economic change *8.

I now turn to an account of the actual recession from 1927/8. I find it difficult not to accord a central role to the double collapse of the domestic stock market in the first half of 1927: of the bond market from February (following the failure of the Reich bond issue) and of the equity market from May (following the anti-speculation measures of the credit banks - prompted by the Reichsbank) *9.
This collapse appears to have induced a temporary behavioural change on the part of the credit banks: 1927 is the only year in the period 1924-31 in which their liquidity ratios improved, evidently as a safety precaution. This seems to have repercussed on the private sector in the form of severe tightening of trade credit conditions (voluntary, and, more important, involuntary) *10. But the very intensity of the evidence

*8 Chapter 7.

*9 Definite signs of recession in the economy appeared in the autumn and winter of 1927 - ie six months to one year after the stock market collapse. This seems to accord well with the lag in the effects of monetary policy noted for the post war world by A Ando, E C Brown et al., 'Lags in Fiscal and Monetary Policy', p 6, (for the USA); and (for the German Federal Republic) by Heinz Müller, 'Die Bedeutung der time lags für die Wirksamkeit der Geld- und Kreditpolitik in der BRD'. See too his Die Politik der deutschen Zentralbank, pp 83ff.

*10 Chapter 2 pp 42ff.

of this deterioration in payments delays etc. also suggests that businesses did not respond to the crisis by significant reduction in the rate of inventory investment; not until early or mid 1928 are there signs of this, followed, later in the year, by slight signs of the easing of pressure on trade credit *11.

The domestic stock market collapse induced a significant reduction in the liquidity of agriculture, and of the public sector. The former sector had reconstructed its debt obligations with extreme rapidity in the preceding years, hence was all the more exposed to deterioration in the financial markets and institutions. In addition, it was poorly placed to evade the constraints of the domestic market by borrowing abroad. The latter sector found recourse to the foreign markets impaired after mid 1927 by the 'overloading' of these markets with German issues at this time *12, and secondly by the intervention of the Advisory Council for Foreign Credits, and of the Agent-General for Reparations.

Thus, in agriculture, whose net dissaving in the years up to 1928 had probably provided an exogenous stimulus to economic activity, there are definite signs of a decline in fixed investment realisations from mid 1928. There was a similar decline in the fixed investment activity in some of those sections of the public/semi-public sector most affected by the collapse of the domestic market and by difficulties of access to

*11 In later 1928 complaints of payments delays etc. seem to have been less frequent than they had been in later 1927, or were to become again in 1929.

*12 As a result of the closure of German access to foreign capital markets by the suspension of the exemption of foreign-issued bonds from capital-yield tax between December 1926 and June 1927.

foreign markets (railways, communes). In other parts of the public/ semi-public sector investment levels continues to rise slowly, but at the cost of deterioration in liquidity *13. There is evidence too that liquidity problems were responsible for some of the early decline of fixed investment in industry and commerce *14.

Fixed investment in industry and commerce (Gewerbe) first fell noticeably in 1928-29, being, along with inventory investment, the main precipitant of economic recession at this time *15. This decline cannot be closely related to capital market conditions. Forty percent of the decline was registered in heavy industry, which had as good or better access to external finance than any other branch of industry; and the rate of investment on the only other two equally favoured branches - electrical engineering and the public electricity supply - did not fall in 1929. Rather, the decline can be attributed to the following factors. Firstly, the weakness of the preceding investment boom. Because of the high cost of capital and of expectations of its future reduction, it seems likely that only a limited number of projects of rapid gestation and payback would be undertaken (as the word 'rationalisation' implies); the supply of such projects ran out toward the end of the decade. A good deal of contemporary comment supports this view *16. Secondly, capacity utilisation levels remained low throughout the quinquennium 1924-29, because, doubtless, of the constrained financial market

*13 Chapter 6

*14 Chapter 8 pp 296-301.

*15 For the following see Chapter 8.

*16 See Appendix VI.

conditions, and the deflationary monetary policy. The quantitative indicators display no overall deterioration of the rate of utilisation during 1927-29, but contemporary descriptions of technical change support the possibility that by then a significantly larger proportion of this capacity had been modernised; perceived excess capacity therefore increased. There is also evidence that in those branches in which utilisation increased 1927-29 (notably mechanical engineering), utilisation rates remained so low, despite this, as to stifle any impetus to increased investment that might have been produced; whereas those branches where utilisation rates fell had experienced hitherto reasonably full capacity operation, so that it was in these branches above all that fixed investment fell. In iron/steel it is likely that the reduction of public sector (above all, railway) investment was a material factor in reducing utilisation levels; thus mediately did the credit crisis affect investment in industry. In the case of textiles (which accounted for twenty percent of the fall in fixed investment in industry in 1928-29) the endogenous operation of the inventory cycle seems to explain most of the reduction in utilisation. Finally, wages pressure resumed during the years of fuller employment after 1927, eroding the internal generation of funds. No branch experienced this erosion as acutely as heavy industry: coal was under pressure from resurgent British competition; iron/steel was exporting, directly and indirectly, a rapidly rising proportion of its output at lower world prices. The Ruhr lock-out of November 1928 seems to be, among other things, the expression of the straits of that industry.

Economic activity was sustained for a while, in the traditional manner, by increasing exports. When exports collapsed at the end of 1929, the extent of the deficiency of domestic demand became manifest. The final prop to domestic economic activity was knocked away by the deflationary fiscal policy. Bound up as this was with the political aims and constraints of the Brüning government, the relevance of the crisis of the public finances, and in particular of the long term inability of the government to float domestic loans (or borrow freely from the Reichsbank) cannot be ignored.

To try to relate this account to that of previous students would, given the multiplicity of views and theoretical frameworks described in the first chapter, demand a lengthy further investment of the reader's time. I cannot claim to have introduced new factors into the explanation, thought of neither by contemporaries nor by other historians, though I have brought new types of evidence to bear on them (eg trade journals). I think I may also claim to have embedded these factors in a closer analysis of the economic system than has hitherto been attempted, showing how domestic economic structure and the 'exogenous' factors (hitherto considered usually in an isolated, <u>seriatim</u> fashion) interacted on each other. Investment activity remains, here as in other studies, central to the analysis of the 'real' side of the German recession. I have tried to restore the analysis of the capital market to a place of centrality consonant with the importance contemporaries attached to it; to bring the factor of the continuous wages pressure, rather neglected by historians, into play in a manner which does justice to the attention attached to <u>it</u> by contemporaries; and to have cast doubt on one or two

views of modern historiography - above all the meaningfulness of the view that the Reichsmark was overvalued *17. I also find myself reassessing the emphasis placed by Hardach on the effects of Reichsbank policy *18. That he, rightly, drew attention to the economic implications of that policy, is not in question; but I believe I have shown that it was a factor which aggravated, rather than determined, the macro-economic instability, and have spelled out, more clearly than hitherto, the probably serious implications for currency stability, had it not implemented such a policy.

Among the aspects of this thesis most in need of further research, I think the analysis of the labour market stands out. The importance of this market in post-inflationary Germany, and maybe in other post-inflationary economies, deserves an attention it has not yet received.

*17 Chapter 5 pp 149 ff.

*18 Still the best reference is G Hardach, 'Reichsbankpolitik und wirtschaftliche Entwicklung 1924-31'.

APPENDIX I

INTER-TEMPORAL WEIGHTING OF THE DEFLATORS

This Appendix attempts to consider the following question:

When deflating an estimate of current value inventories, nominally held at the end of a particular year, what spread of months around that period should be included in the deflator, and with what weighting?

The question is most directly relevant for data derived from balance sheet analysis. It has however a relevance for data derived from questionnaires also, since respondents probably provided estimates of these end-of-year stocks either directly from their balance sheets, or valued in the same way as in their balance sheets.

The question boils down to three practical issues:

(1) What is the consequence of the fact that in reality certain firms balanced at dates other than 31.12 and that Keiser and Benning et al adjusted these balance sheets to provide aggregative "synthetic" year-end estimates?

(2) What assumptions should we make about the method of valuation of inventories in the balance sheets?

(3) What assumptions should we make about the average period of turnover of inventories?

Various aspects of these three questions will be discussed in turn. Then on the basis of this discussion, a "model" of the main features of the structure of the Keiser and Benning "synthetic" estimates will be developed. The sensitivity of estimates of deflators to alternative assumptions about numerical values of the various sets of parameters of the model will be explored and finally, on the basis of this, a simple

scheme of alternative assumptions will be outlined, which is likely to produce a set of alternative estimates of deflated inventory investment that encompasses the true value.

I.1.1. The Balancing Date Scatter

Keiser and Benning provide no clue about the prevalence of balancing dates other than 31.12, and I possess no other aggregative evidence. However, Table I/1, p 375 has been produced from the small sample of German firms for which I do have evidence.

The marked tendency of mining and ferrous metallurgy, and of electrical engineering, not to balance at 31 December is manifest. The tendency of all other branches, and in particular those dominated by a smaller scale of firms, eg textiles and mechanical engineering (where not owned by heavy industrial concerns) to balance on 31 December is equally evident. This is a very small sample. But in sofar as it over-represents large firms grossly, and it seems as if it is the large firms that balance at other than 31 December, the above conclusions seem justified.

What are the consequences of this observation for the deflation procedure? Previous researchers either faced different problems or are not explicit about how they solved them *1.

In my case, the estimates of inventory levels which I have built up definitely refer to year-ends. They are derived by cumulating estimates of calendar-year inventory investment at current prices. Keiser and

*1 A Abramovitz op.cit. pp 504-5. C H Feinstein op.cit. p 32. Central Statistical Office; National Accounts Statistics; Sources and Methods does not mention the problem.

Table I/1 Small Sample of Firms Arrange according to Balancing Date

31st December		30th June		30th September/ 31st October		Other	
Firm	Branch	Firm	Branch	Firm	Branch	Firm	Branch
Accumulatoren Fabrik	E	Gütehoffnungshütte	I/S	AEG	E	Deutsche Verkehrs-Kredit Bank	F
AG für Chemische Produkte	Ch	Klöckner	I/S	Siemens u. Halske	E	Hoesch	I/S
Anglo Continentale Guano	Ch	Köln-Neuessen	I/S	Siemens Schuckert	E	Horch	V
Bank für Textilindustrie	F	MAN	M	Adlerwerke	V	RWE	PU
Baumwollfabrik) Erlangen-Bamberg	T	Motoren Deutz	M/V			Ver.Stahlwerke	I/S
BMW	V	Rheinmetall-waaren	F			Neunkirchener Eisen	I/S
R Bosch	E	Vogtländische Maschinen	M				
Bergmann	E						
Bremer Woll	T						
Daimler Benz	V						
Demag	M						
Deutscher Eisenhandel	F						
Deutsche Kredit u. Handelsges.	F						
Deutsche Textil Mautner	T						
C Diesig	T						

31st December c'td		31st December c'td		31st December c'td	
Felten u Guilleaume	E	Lingner	?Ch	Riedel de Haen	Ch
Getreide-Kredit Bank	F	Lorenz	E	Rütgerswerke	Ch
Hammersen	T	Mannesmann	I/S	Schimmel	?Ch
Harpener	C	Mech.Baumwoll ...Augsburg	T	Schles.Bg.wks.u. Hütten	I/S
Industrie-Finanzierung Ost	F/G	Mech.Web..zu Linden	T	Schubert u. Salzer	M
IG Farben	Ch	Meyer Kauffmann	T	Websky Hartmann	T
Kali-Chemie	P	NAG	V	Wollwäscherei Döhren	T
Gebr Körting	M	Norddeutsche Woll	T		

ABBREVIATIONS: C = Coal Mining; Ch = Chemicals; E = Electrical Engineering; F = Financial and Trading; I/S = Iron/Steel; M = Mechanical Engineering; P = Potash; PU = Public Utility; T = Textile; V = Vehicles.

Benning et al incorporated inventory investment of firms not balancing at the year-end into these estimates by apportioning this investment between calendar years. How was this apportionment done? They did not simply do it on a "straight-line" basis; rather they used extraneous information to determine how to allocate the total *2.
Thus for each industry, to determine the inter-temporal weighting appropriate to its deflator we need to consider :

(i) The balancing-date scatter for that industry

(ii) The probable apportionment between calendar years by the original researchers, of investment of companies not balancing at 31.12.

To do this exhaustively would require masses of information, some of which (especially for (ii)) is doubtless irretrievably lost. It would also require aeons of time. But the sensitivity of results to alternative assumptions as to these two types of variables can at least be explored on a sample basis.

I.1.2. Valuation of Inventories

It seems certain that German firms, like British, valued their inventories at "cost or current price whichever is lower." *3 Cost is either purchase price or cost of manufacture; the question of the inclusion of overheads is discussed in the text pp 213-5 .

*2 See Keiser and Benning op.cit. p 177.

*3 eg T Ascher op.cit. pp 192-3; 226-8. A F Schuster op.cit. comment on Sections 40, 2 61. Handwörterbuch der Sozial wissenschaften Vol. 2 pp 248 (Art. on "Bilanz").

Current price for finished goods is apparently the price at which the good could be sold: ie the market price of finished goods *4. When prices are falling there is therefore little difficulty about the valuation of inventories (in principle). What valuatin principle is operative when prices are rising?

I know of no empirical research on the practice of firms in this respect, so we must proceed on more general information particularly discussions of the construction of commercial balance sheets and of the rules of taxation authorities.

A prevalent method of valuation seems to have been the so-called "base-stock" method *5, also prevalent in England before the Second World War. Under this method, the "base-stock" need only be revalued at longish, irregular intervals. Net additions to base-stock, insofar as recorded in the balance sheet will be valued at very recent prices. Thus in a crude way this method approximates to a so-called LIFO method, and would argue for the incorporation in the deflator of a fairly long span of months prior to the balancing date, greater than the period of stock turnover.

The only other method allowed, as far as I can see, was the so-called "age of specific lots method." I infer this from the fact that according to one source the so-called FIFO and LIFO methods "have never been recognised by the German authorities"; according to another they are allowed "only when they correspond to the firm's actual stock-management

*4 A F Schuster op.cit.; comment on Section 261.
E Schmalenbach op.cit. pp 178-188.

*5 Handwörterbuch der Sozialwissenschaften loc.cit.
E Schmalenbach op.cit. pp 178-190.

pattern" *6. For different kinds of inventories, different patterns are doubtless desirable, depending on perishability and the like, and on the method of access permitted by the method of storage.

Perishable, obsolescent goods, etc, are likely to be utilised on a FIFO basis. The number of months prior to the balancing date will be approximately equal to the period of stock turnover.

If we assume that non-perishable goods (etc) valued on the "age of specific lots" basis are subject to a random order of utilisation, we can take over Abramovitz's findings on the subject :

> "Experiment with arithmetical examples based upon the assumption that the goods used each month have an average age equal to the average of the supply available at the beginning of the month indicates that, on the average, actual cost of specific lots accounting will produce an age distribution of inventory such that the percentage bought in any given month decreases rapidly as one goes backward from the reporting date. Hence the bulk of the stock is likely to date from the last few months of the year, although an infinitesimal fraction is indefinitely old." *7

Where the assumptions for this type of valuation hold, the months prior to balancing date should therefore (ideally) be accorded an exponentially declining system of weights.

Other forms of inventory, eg fluids, will however be valued in yet different ways.

We have now discussed a number of methods of inventory valuation probably in operation in Germany in this period. To combine this information adequately we would need at least three sorts of information.

*6 Ibid.

*7 M Abramovitz op.cit. p 535.

(i) The extent to which each method was used.

(ii) The gross rate of change of real inventories at all significant balancing dates. This is because, within any one method the "centre of gravity" of the set of valuation prices will shift relative to the balancing dates in a manner dependent on how stocks are changing around that time.

(iii) The average rate of turnover of inventories. In all methods the number of months included in the set of valuation prices will bear some direct relation to the rate of turnover.

Information under head (i) is not to hand. The pattern of gross change of stocks could, within wide margins, probably be reconstructed for most significant branches, but this information is of little use if the relative prevalence of different methods of valuation is unknown. With so much unknown the simplest procedure seems to be to experiment with the average prices for different numbers of months prior to the balancing dates and see how sensitive the results are to the different lengths of time included. This corresponds to the methods of Feinstein *8, and Abramovitz *9. Feinstein assumed that a FIFO valuation scheme predominated in his sources. However, it appears that in fact the base-stock method was very prevalent in the United Kingdom between the wars *10; he does not explicitly consider this. Abramovitz assumed that only FIFO or "age of specific lots scheme" underlay his data; this assumption seems well grounded in United States practice.

*8 C H Feinstein op.cit. p 32.

*9 M Abramovitz op.cit. pp 535-6.

*10 From a conversation with Prof. G Whittington.

The British National Accounts also assume that a FIFO scheme underlies all present-day balance sheets of industrial companies, and in general they deflate by the average price for the number of months prior to balancing date which corresponds to the average period of turnover of stocks according to the most recent census of production. Separate methods, employing a declining weight scheme, are used however for industries with much work in progress *11.

Thus, for the valuation of stocks when prices are rising, the use of an unweighted average of prices over a period of months prior to the balancing date is a well-worn method. The errors implicit in so rigid a scheme cannot be overlooked however, particularly since the pattern of gross change of inventories at any one time is likely to be parallel for most branches of industry and trade.

I.1.3. Average Period of Turnover of Inventories

It is convenient to follow the discussion of the valuation method with the integrally connected question of the avereage period of turnover of stocks.

I lacked access to German evidence on this question. So, as comparable evidence I used the United Kingdom Censuses of Production of 1963 and 1968 (for manufacturing) and Censuses of Distribution of 1950 and 1961 (for wholesale and retail trade). The rough estimates of average period of turnover derived from these are reproduced in Tables I/2 and /3 below. For manufacturing, according to Table I/2, average period of turnover

*11 Central Statistical Office: Nat.Accounts Statistics pp 402-405.

Table I/2 Estimates of Average Turnover of Inventories in Manufacturing

Estimate = Materials, fuel, stores, work in progress and goods for sale, all on hand at end of year, divided by sale and work done during year.

Order	Short Name	1963	1968
III	Food, etc	.14	.13
IV	Coal, Petrol	.14	.12
V	Chemicals, etc	.16	.17
VI	Metal Mfg.	.18	.18
VII	Mech.Engineering	.35	.45
VIII	Instrument Eng.	.34	.37
IX	Elec. Engineering	.32	.30
X	Shipbuild. etc	.39	.65
XI	Vehicles	.29	.25
XII	Metal Goods n.e.s.	.16	.19
XIII	Textiles	.23	.22
XIV	Leather Etc	.23	.21
XV	Clothing etc	.18	.18
XVI	Bricks, Pottery etc	.16	.14
XVII	Timber, Furniture	.18	.19
XVIII	Paper, Printing	.14	.14
XIX	Other Mfg.	.18	.18
Total:	All Manufacturing	.21	.23
II	Mining etc	.12	.28
XX	Construction	.05	.04
XXI	Gas, Elec., Water	.09	.08
Total:	All Industry	.18	.19

SOURCE: Dept. of Trade and Industry, Business Statistics Office: Report on the Census of Production 1968; Vol. 156: Summary Tables: Industry Analyses pp 36-60.

Table I/3 Estimates of Average Turnover of Inventories in Retail and Wholesale Trade

Estimate for Retail = $\frac{\text{End of Year Stocks}}{\text{Calendar Year Sales}}$

Estimate for Wholesale = $\frac{\text{End of Year Stocks}}{\text{Calendar Year Purchases}}$

RETAIL	1950	1961
Groceries	0.08	0.07
Other Foods	-	0.03
Clothing, Footwear etc	0.19	0.18
Hardware	0.23	0.23
Chemists	0.20	0.19
Furniture etc	0.19	0.18
Dep't Stores	0.13	0.12
Retail Co-ops	0.10	0.09
Total Retail	0.12	0.11

WHOLESALE	1950
Agric.Produce/Supplies	0.05
Builder's Merchants / Hardware	0.15
Coal	0.01
Metals, Metal Products	0.09
Timber	0.14
Other Industrial Materials	0.09
Machinery (not elec.)	0.17
Elec. goods	0.19
Groceries etc	0.06
Clothing, Footwear / Textiles	0.14
Furniture etc	0.21
Glass, China	0.11
Export Merchants	0.05
Import Merchants	0.08
Total Wholesale	0.11

SOURCES: Retail 1950 : Board of Trade, Census of Distribution 1950 Vol II (Retail and Service Trade) Table 24, pp 194-210.

Retail 1961 : Ditto for 1961, Part 14, Table 6 pp 14/36 - 14/52.

Wholesale 1950 : Ditto for 1950, Vol III (Wholesale Trades) Table 13 pp 125-130.

is less than three months (0.25) for all Orders' except engineering. (If, for accuracy, profits were eliminated from the divisor, the conclusion would be little affected). For all branches of trade (Table I/3) average period of turnover seems to be less than three months.

Abramovitz consider that, where FIFO or 'age of specific lots' valuations underly the data, the deflator should incorporate a number of months equal to $1\frac{1}{2}$ times the average period of turnover *12. Where base stock valuations are prominent, a longer period might be appropriate. Feinstein uses four months uniformly *13. Current UK National Accounting practice differs from branch to branch; the numerical example in the handbook employs a two-month period *14.

In the formal model developed below the sensitivity of the results to different periodisations of the deflator will be examined.

1.2.1. A Model of the Structure of Keiser and Benning's Estimates

In the model constructed in this section, I will attempt to lay bare the structure of the 'synthetic' estimates of year-end stocks, and hence of current value inventory investment, prepared by Keiser and Benning and the Stat.Reichsamt.

*12 Loc.cit.

*13 Loc.cit.

*14 Central Statistical Office op.cit. pp 400-407.

Assumptions

Ass 1 There is only one kind of commodity.

Ass 2 Valuation of Inventories: the following three alternative schemes are employed.

i) All inventories can be considered to have been valued by the average purchase price during the twelve months preceding the balancing date.

ii) All inventories can be considered to have been valued by the lower of the average purchase price during the six months preceding the balancing date, and that ruling in the month in which the balancing date falls.

iii) All inventories can be considered to have been valued by the lower of the average purchase price during the three months preceding the balancing date, and that ruling in the month in which the balancing date falls.

Ass 3 Distribution of Balancing Dates. It is assumed that firms balance at the end of any of the four quarters of the year, but not at other times. The following three concrete alternatives were employed :

i) All firms balance at 31st December.

ii) Of the aggregate of stocks in Keiser and Benning's 'synthetic' year-end estimates, 50% pertain to firms balancing at 31st December, and 16.7% each to firms balancing at the end of each of the other three quarters.

iii) Of the aggregate of stocks in Keiser and Benning's 'synthetic' year-end estimates, 25% each pertain to firms balancing at the end of each of the four quarters.

Ass 3(ii) and Ass 3(iii) require us to make further assumptions about how the original researchers apportioned between the relevant calendar years the inventory investment of firms not balancing at the year-end. I employed the alternative assumptions :

Ass 4 i) The original researchers apportioned the inventory investment of firms between calendar years on a 'straight-line' (pro-rata) basis (ie as if there was a constant net rate of investment).

ii) The original researchers apportioned the inventory investment flexibly, on the basis of extraneous information.

The model developed is general enough to encompass all of these alternative formulations of Ass 2, 3 and 4.

Notation

Let V_t represent the number of goods in all inventories published in balance sheets, pertaining to dates within the calendar year 't'.

Let $V_{1t}p_{1t}$ represent the aggregate value of inventories appearing in the balance sheets of firms balancing at 31.3.t, as valued by the methods employed in those sheets.

Define $V_{2t}p_{2t}$ analogously to $V_{1t}p_{1t}$, but for 30.6.t .

$V_{3t}p_{3t}$ analogously to $V_{1t}p_{1t}$, but for 30.9.t .

$V_{4t}p_{4t}$ analogously to $V_{1t}p_{1t}$, but for 31.12.t .

(1)
Let $V_tp_t = V_{1t}p_{1t} + V_{2t}p_{2t} + V_{3t}p_{3t} + V_{4t}p_{4t}$

ie denote the totality of stocks appearing in balance sheets pertaining to year t, at the valuations used therein.

Further, on analogy with (1),

(1a)
Let $V_t = V_{1t} + V_{2t} + V_{3t} + V_{4t}$

Let $(\text{est } V_tKB)$ represent Keiser and Benning's 'synthetic' estimate of what inventory levels would have been at 31.12.t , if all firms had balanced at that date.

Let $(\text{est } CVII_t) = (\text{est}V_tKB) - (\text{est } V_{t-1}KB)$

ie represent Keiser and Benning's estimate of current value inventory investment in calendar year t .

To obtain this estimate they had to apportion between calendar years the first differences in inventory levels reported in successive balance sheets of all firms not balancing at 31st December.

For firms balancing at 30.9 let

$x_t(V_{3t}p_{3t} - V_{3t-1}p_{3t-1})$ be the proportion of the difference between inventory levels at 30.9.t and 30.9.t-1 (of firms balancing at that date) assigned by Keiser and Benning to year t .

$(1 - x_t)(V_{3t}p_{3t} - V_{3t-1}p_{3t-1})$ is therefore the proportion of the same assigned to year t-1 .

For firms balancing at 30.6 I define analogously

$y_t(V_{2t}p_{2t} - V_{2t-1}p_{2t-1})$ and $(1 - y_t)(V_{2t}p_{2t} - V_{2t-1}p_{2t-1})$

For firms balancing at 31.3 I define analogously

$z_t(V_{1t}p_{1t} - V_{1t-1}p_{1t-1})$ and $(1 - z_t)(V_{1t}p_{1t} - V_{1t-1}p_{1t-1})$

Assume that at the start of year '1' stocks are nil. Then Keiser and Benning's estimate of current value inventory investment in year '1' may be represented by expression (2) on the following sheet. (3) on the same sheet represents their 'synthetic' estimate of current value inventory level at the end of year '1'. By repeating the process, general expression for their estimates of current value inventory investment and of year-end inventory levels can be obtained, as shown in (4) and (5) respectively.

(5) - the general expression for inventory values at the year-end - is what we wish to deflate. A satisfactory deflated equivalent would be :

$$(6)\quad p_b\big[V_{4t} + x_{t+1}V_{3t} + y_{t+1}V_{2t} + z_{t+1}V_{1t} + (1-x_{t+1})V_{3t+1} + (1-y_{t+1})V_{2t+1} + (1-z_{t+1})V_{1t+1}\big]$$

Let (6) be represented by p_bN_t where N_t represents the expression in square brackets. (5) can be converted to (6) by the following tautology:

(please turn to p 388)

(2)

$$(\text{est } CVII_1) = V_{4.1}p_{4.1} + V_{3.1}p_{3.1} + V_{2.1}p_{2.1} + V_{1.1}p_{1.1} + (1-x_2)(V_{3.2}p_{3.2} - V_{3.1}p_{3.1}) + (1-y_2)(V_{2.2}p_{2.2} - V_{2.1}p_{2.1}) + (1-z_2)(V_{1.2}p_{1.2} - V_{1.1}p_{1.1})$$

(3)

$$(\text{est } V_1KB) = V_{4.1}p_{4.1} + x_2V_{3.1}p_{3.1} + y_2V_{2.1}p_{2.1} + z_2V_{1.1}p_{1.1} + (1-x_2)V_{3.2}p_{3.2} + (1-y_2)V_{2.2}p_{2.2} + (1-z_2)V_{1.2}p_{1.2}$$

(4)

$$(\text{est } CVII_t) = (V_{4t}p_{4t} - V_{4t-1}p_{4t-1}) + x_t(V_{3t}p_{3t} - V_{3t-1}p_{3t-1}) + y_t(V_{2t}p_{2t} - V_{2t-1}p_{2t-1}) + (1 - x_{t+1})(V_{3t+1}p_{3t+1} - V_{3t}p_{3t}) + (1-y_{t+1})(V_{2t+1}p_{2t+1} - V_{2t}p_{2t})$$

$$z_t(V_{1t}p_{1t} - V_{1t-1}p_{1t-1}) + (1-z_{t+1})(V_{1t+1}p_{1t+1} - V_{1t}p_{1t})$$

(5)

$$(\text{est } V_tKB) = V_{4t}p_{4t} + x_{t+1}V_{3t}p_{3t} + y_{t+1}V_{2t}p_{2t} + z_{t+1}V_{1t}p_{1t} + (1-x_{t+1})(V_{3t+1}p_{3t+1} + (1-y_{t+1})V_{2t+1}p_{2t+1} + (1-z_{t+1})V_{1t+1}p_{1t+1}$$

$$(\text{est } V_t KB) \cdot \frac{p_b N_t}{(\text{est } V_t KB)} = p_b N_t \quad \text{, if we can ascertain the ratio:}$$

$$(7) \quad \frac{p_b N_t}{(\text{est } V_t KB)}$$

Let $a_t = \frac{V_{4t}}{N_t}$ $\qquad$ $c_t = \frac{V_{2t}}{N_t}$, $c_t^* = \frac{V_{2t+1}}{N_t}$

$b_t = \frac{V_{3t}}{N_t}$, $b_t^* = \frac{V_{3t+1}}{N_t}$ $\qquad$ $d_t = \frac{V_{1t}}{N_t}$, $d_t^* = \frac{V_{1t+1}}{N_t}$

Thus we can rewrite ratio (7) :

$$(8) \quad \frac{p_b N_t}{(\text{est } V_t KB)} = \frac{N_t}{\frac{1}{p_b} N_t \left[a_t p_{4t} + x_{t+1} b_t p_{3t} + \ldots \right.}$$

$$\left. + \ldots \qquad \ldots + (1-z_{t+1}) d_t^* p_{1t+1} \right]$$

N_t cancels out, and the inverse of (8) is the desired deflator. To make further progress, some heroic simplifications have to be introduced.

Ass 5 We assume that the levels of inventories are large relative to changes in these levels.

Ass 6 We assume that the relative 'market shares' of sub-aggregates of firms balancing at the end of each quarter do not change.

On the basis of these two assumptions we infer

$$(9) \quad V_t \simeq V_{t+1} \; ; \; V_{1t} \simeq V_{1t+1} \; ; \; V_{2t} \simeq V_{2t+1} \quad \text{etc.}$$

$$(10) \quad b_t \simeq b_t^* \; ; \; c_t \simeq c_t^* \; ; \; d_t \simeq d_t^*$$

$$(11) \quad N_t \simeq V_t \simeq V_{t+1}$$

In estimating the deflator, we treat the approximations in (9), (10) and (11) as equalities. To do so in respect of the 'model' embodied in expressions (5) and (6) is strictly speaking illogical unless stocks are

invariant. But only by this means can we obtain a deflator that can be calculated with the meagre data to hand. We rewrite (8) in the light of (9), (10) and (11), and invert it :

$$(12)\quad \frac{1}{p_b}\Big[a_t p_{4t} + x_{t+1} b_t p_{3t} + \dots + (1-x_{t+1}) b_t p_{3t+1} + \dots \quad \dots + (1-z_{t+1}) d_t p_{1t+1}\Big]$$

What sort of bias does this simplification introduce? Under the following conditions:

that real stocks and prices rise and fall simultaneously and at the same rate

- it can easily be demonstrated that (12) will always <u>underestimate</u> the inverse of (8), because it will always assign relatively too small a weight to the higher price components of the deflator. Other conditions will modify this bias however, so that in fact it may not be too serious.

I.2.2. Testing the Sensitivity of the Model to Alternative Specifications of the Parameters

We now wish to test the consequences for the value of the price deflator expressed in (12), of alternative formulations of the assumptions <u>Ass 2</u>, <u>Ass 3</u> and <u>Ass 4</u>.

To begin with, we assume <u>Ass 4(i)</u>, in all cases: ie straight-line apportionment by the original researchers of the investment of firms not balancing at the year end. In the notation of the above model this implies for (12)

$$(13)\quad x_{t+1} = \tfrac{3}{4}; \qquad y_{t+1} = \tfrac{1}{2}; \qquad z_{t+1} = \tfrac{1}{4}; \qquad t = 0,1,2 \dots$$

We also need to translate the alternative formulations of Ass 3 into numerical values of $a_t \ldots d_t$. It can be seen that

under Ass 3(i) $a_t = 1$; $b_t = c_t = d_t = 0$; $t = 0,1,2 \ldots$

under Ass 3(ii) $a_t = \frac{1}{2}$; $b_t = c_t = d_t = \frac{1}{6}$; $t = 0,1,2 \ldots$

under Ass 3(iii) $a_t = b_t = c_t = d_t = \frac{1}{4}$; $t = 0,1,2 \ldots$

With this information we can tabulate the weights which should be attached to each of $p_{1t} \ldots p_{3t+1}$ in expression (12), under straight-line apportionment. The results can be seen in Table I/5 on page 393 below, firstly for Ass 3(i), (where all firms balance at the year-end), and secondly for the other two balancing date scatter assumptions.

If we further complicate matters by assuming Ass 4(ii) (ie flexible apportionment), then we can no longer assume that x, y, and z will have the same value in every year. Instead we have to postulate how the original researchers perceived the turning-points in inventory investment from period to period, and then how, on the basis of this perception, they apportioned investment in each period.

These assumptions will be exemplified below in the case of aggregate inventories in manufacturing industry and mining. We postulate that the original researchers perceived the turning-points in inventories in this case at the following dates:

Turning Points			Sign of Inventory Investment
(Trough)	Jan 1924		
	to	.....	Positive
(Peak)	Sept 1925		
	to	.....	Negative
(Trough)	Sept 1926		
	to	.....	Positive
(Peak)	Dec 1928		
	to	.....	Approx. Zero
(Peak)	Sept 1929		
	to	.....	Negative
(Trough)	Sept 1930		

Even this postulated pattern of inventory investment does not give exact guidance about apportionment procedure. Let us assume however that their procedure was as represented in the following table. The subsequent notes explain the less clear-cut decisions.

Table I/4

Weights for deflator of (est $V_t KB$) at year-end	x_{t+1}	y_{t+1}	z_{t+1}
t = 1924	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$
t = 1925	$\frac{3}{4}$	1	$\frac{1}{4}$
t = 1926	$\frac{3}{4}$	1	$\frac{1}{4}$
t = 1927	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$
t = 1928	$\frac{3}{4}$	$\frac{1}{4}$	0
t = 1929	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$

Rationale of above Table: (For brevity the "p_t" parts of the "$V_t p_t$" terms have been omitted below).

(a) 1925 $y_{t+1} = 1$ This is a consequence of the assumption that all of $(V_{2.26} - V_{2.25})$ should be assigned to 1926. As ex hypothesi

an upper turning point occurred at 30.9.25, the gross increase in stocks in the 3rd quarter of 1925 would be cancelled out by the gross decrease in the 4th, and the net decrease would be confined to the first quarter of 1926.

(b) 1925 $z_{t+1} = \frac{1}{4}$ The implication is that $(V_{1.26} - V_{1.25})$ was apportioned on a straight-line basis even despite the upper turning point at 30.9.25. If $(V_{1.26} - V_{1.25})$ is negative, this decrease will have occurred in the last quarter of 1925 and the first of 1926; under this possibility $z_{t+1} = \frac{1}{2}$.

But if $(V_{1.26} - V_{1.25})$ is positive, all of the increase will have occurred in 1925, so that $z_{t+1} = 0$. We do not know which is true, so we take the average: $z_{t+1} = \frac{1}{4}$.

(c) 1926 $y_{t+1} = 1$ See (a) above. 30.9.26 is a lower turning point.

(d) 1926 $z_{t+1} = \frac{1}{4}$ See (b) above. 30.9.26 is a lower turning point.

(e) 1928 $x_{t+1} = \frac{3}{4}$ See (b) above: the grounds here are analogous.

(f) 1928 $y_{t+1} = \frac{1}{4}$ The implication is that $(V_{2.29} - V_{2.28})$ is positive, but that the net increase largely occurred in 1928.

(g) 1928 $z_{t+1} = 0$ This is on the same grounds as in (f).

(h) 1929 $z_{t+1} = \frac{1}{2}$ This is bec use 30.9.29 is assumed to be an upper turning point.

Table I/5 Weighting Structure for the Set of Valuation Prices in the Price Deflator represented in Expression (11)

	P_{1t}	P_{2t}	P_{3t}	P_{4t}	P_{1t+1}	P_{2t+1}	P_{3t+1}
Ass 3(i)	0	0	0	1	0	0	0
Straight-Line Apportionment							
Ass 3(ii), 4(i)	.042	.083	.125	.500	.125	.083	.042
Ass 3(iii), 4(i)	.063	.125	.188	.250	.188	.125	.063
Flexible Apportionment							
Ass 3(ii), 4(ii)							
1924	.042	.083	.125	.500	.125	.083	.042
1925	.042	.167	.125	.500	.125	.000	.042
1926	.042	.167	.125	.500	.125	.000	.042
1927	.042	.083	.125	.500	.125	.083	.042
1928	.000	.042	.125	.500	.167	.125	.042
1929	.083	.083	.125	.500	.083	.083	.042
Ass 3(iii), 4(ii)							
1924	.063	.125	.188	.250	.188	.125	.063
1925	.063	.250	.188	.250	.188	.000	.063
1926	.063	.250	.188	.250	.188	.000	.063
1927	.063	.125	.188	.250	.188	.125	.063
1928	.000	.063	.188	.250	.250	.188	.063
1929	.125	.125	.188	.250	.125	.125	.063

Thus we have worked out a specific system of flexible apportionment whose implications can be tested along with the other formulations of the assumptions. It must be remembered that we are concerned with an example only; the accuracy of the flexible apportionment system is not very important. In the lower part of Table I/5 the intertemporal weighting for each year implicit in this flexible apportionment scheme is shown under the two relevant assumptions about balancing date scatter.

As yet we have said nothing about the alternatives of Ass 2, ie the three alternatives about the content of "p" in our notation. Each of the 5 different combinations of Ass 3 and Ass 4, set out in Table I/4, can be combined with any of the three formulations of Ass 2 to give 15 permutations of Ass 2, 3 and 4 altogether.

For the purposes of our example, ie of deflating aggregate stocks in manufacturing industry and mining, the official wholesale price index was used. The appropriate deflators for inventories appearing at the end of every quarter from 1.1.24 to 30.9.30 was calculated under each formulation of Ass 2, and the results substituted into expression (11) for each of the 5 intertemporal weightings set out in Table I/5. The resultant deflators for the "synthetic" estimates of year-end stocks are given below in Table I/6.

Table I/6 Price Deflators under Alternative Formulations of Assumptions relevant to the Inter-Temporal Weighting

Deflator used : The Official Wholesale Price Index with 1928 = 100

(a) Deflator for 1.1.24 : In all cases the average value of the index Jan.-June 1924 = 98.0

Assumption Formulation			Deflator for year end 31.12.					
Ass 2	Ass 3	Ass 4	1924	1925	1926	1927	1928	1929
(i)	(i)	-	98.1	101.3	96.0	98.3	100.0	98.0
(i)	(ii)	(i)	98.5	98.5	97.7	98.4	98.4	97.4
(i)	(ii)	(ii)	98.5	98.6	97.7	98.4	98.4	97.4
(i)	(iii)	(i)	98.4	98.3	97.7	98.3	98.4	97.2
(i)	(iii)	(ii)	98.4	98.5	97.6	98.3	98.4	97.3
(ii)	(i)	-	98.1	99.9	96.7	99.4	99.9	95.9
(ii)	(ii)	(i)	98.5	98.9	96.3	99.0	99.5	95.2
(ii)	(ii)	(ii)	98.5	99.4	96.1	99.0	99.4	95.1
(ii)	(iii)	(i)	98.8	98.4	96.1	98.8	99.3	94.8
(ii)	(iii)	(ii)	98.8	99.2	95.7	98.8	99.1	94.7
(iii)	(i)	-	101.1	99.9	97.7	99.7	99.9	95.9
(iii)	(ii)	(i)	99.9	99.0	96.5	98.6	99.5	94.8
(iii)	(ii)	(ii)	99.9	99.3	96.5	98.6	99.4	95.2
(iii)	(iii)	(i)	99.3	98.6	96.0	98.1	99.3	94.3
(iii)	(iii)	(ii)	99.3	99.3	95.9	98.1	99.1	94.8

SOURCE to Table I/6: The Official Wholesale Price Index :
Stat.Jahrbuch f.d.Dt.R., 1927 p 301; 1930 p 278.

Perhaps the first impression conveyed by Table I/6 is that of the insensitivity of the estimates to alternative intertemporal weighting structures. This impression is somewhat misleading, and a consequence of the relative stability of the aggregate wholesale price index. In an earlier draft, alternative intertemporal weighting structures were exemplified in the case of Spinning and Weaving; the deflator applied (textile raw materials and semi-manufactures) was much more volatile, and as a consequence, estimates of deflated inventory investment varied quite considerably under different assumptions. However for other reasons (namely that that price index showed marked secular decline) that example was less suitable than this.

I.2.3. Which Range of Assumptions about Inter-Temporal Weighting of Price Deflators should be adopted in Practice?

In order to deflate the entire range of inventory investment data we shall wish to employ a scheme of assumptions as to inter-temporal weighting which is both simple to operate, and also likely to encompass the limits within which the "true" constant price inventory investment lies. We want to find out which set of assumptions is most critical to the deflated values, and to operate a scheme which will vary in respect of these, using for convenience' sake a constant set of formulations of the other assumptions.

An "analysis of variance" was used to identify the critical assumption.

Table I/7 Analysis of Variance for Table I/6

Note : For Comparability, the Variances are expressed as percentages of the Means of deflators in the group.

A Variance within Groups %

Assumption Common to Group	Variance of Deflators for Inventories at Year-End					
Ass	1924	1925	1926	1927	1928	1929
2 (i)	0.22	1.29	0.46	0.00	0.42	0.08
2 (ii)	0.07	0.25	0.11	0.04	0.07	0.19
2(iii)	0.43	0.20	0.42	0.34	0.07	0.29
3 (i)	2.02	0.47	0.44	0.36	0.00	1.01
3 (ii)	0.45	0.14	0.71	0.06	0.25	1.23
3(iii)	0.14	0.15	0.69	0.17	0.15	1.60
4 (i)	0.29	0.07	0.53	0.09	0.23	1.57
4 (ii)	0.29	0.15	0.64	0.09	0.17	1.37

B Variance between Means of Groups of same "Set" %

Set of Groups varying as to Formulation of	Variance of Means of Deflators for Inventories at Year-End					
	1924	1925	1926	1927	1928	1929
Ass 2	0.48	0.01	0.22	0.08	0.11	1.39
Ass 3	0.22	0.55	0.02	0.08	0.19	0.22
Ass 4	0.00	0.06	0.00	0.00	0.00	0.00

The price deflators in Table I/6 were grouped in various ways. Firstly according to whether they incorporated Ass 2(i), (ii) or (iii) - ie deflators using the same valuation assumption were grouped together. Secondly they were grouped according to whether they incorporated Ass 3(i), (ii) or (iii); ie deflators using the same balancing date scatter assumption were grouped together. Thirdly they were grouped according to whether they incorporated Ass 4(i) or (ii) - ie deflators

using Straight-line apportionment grouped separately from those with flexible apportionment. For all of these sets of groups variance within each individual group was computed and also variance between the means of the groups of the same set. The results are seen in Table I/7.
The "critical" type of assumption will be that for which variance within groups is minimised and between groups is maximised.
Broadly speaking, it is clear that Ass.2 best fits this criterion. This is not just a consequence of the specific example used. When, in the previous draft, the model was exemplified on Spinning and Weaving data, the result was much more unambiguous.
And in fact, this criterion is biassed against Ass.2 when prices are falling; because in these cases the deflators (other assumptions constant) take on the same value under Ass 2(ii) and Ass 2(iii).
When prices are falling therefore, the variance between groups (which we seek to maximise) is subject to a minimising constraint. No such force operates in groups based on formulation of Ass 3 or Ass 4.

In constructing deflators therefore for the entire data on inventory investment we shall use a set which vary in respect of the formulations of Ass 2, and hold all the others constant.
Which set of other variables should be employed and held constant?
Inspection of Table I/6 shows that, for all its complexity, Ass 4(ii) produces results little different from the simpler Ass 4(i); this would probably be true of most flexible apportionment schemes. Ass 4(ii) is ruled out.
Ass 3(i), Ass 3(ii) or Ass 3(iii)? For most industries the balancing date scatter probably lies between Ass 3(i) and Ass 3(ii). In industries where this is not true, eg Iron, Steel and Coal, experimentation showed

that alternative assumptions, eg that all firms balanced at 30.9, produced results little different from the results where it was assumed all balanced at 31.12.

Therefore, for simplicity's sake, the other set of assumptions employed was Ass 3(i): that all firms balance at 31.12. The three formulations of Ass 2 therefore become (with the simplified notation employed in the text)

Assumption	Simplified Notation	Precise Reference
Ass 2 (i)	AA	Annual Average of appropriate price deflator
Ass 2 (ii)	2HD	The lower of the average July-December price or the December price
Ass 2(iii)	4QD	The lower of the average October-December price or the December price.

It can be verified that in four out of six cases in Table I/6 the three combinations Ass 3(i), Ass 2(i), (ii) and (iii) do lie at the upper and lower limits of the entire set (a fortiori if the true balancing date scatter does lie between Ass 3(i) and (ii)).

Reference to p 380 above, on average turnover, clearly indicates that Ass 2(i) (annual average prices) is most unlikely to represent the truth unless an extreme "base-stock" valuation method is prevalent. It is incorporated mainly for comparability with Hoffmann's estimate.

In most cases except engineering a scheme incorporating three to four and a half months would be adequate and conform with Abramovitz and Feinstein's practice (see above p 383). It happens fortunately that the estimates for engineering are very insensitive to the number of months included. Therefore for the aggregate estimates each formulation of Ass 2 will be used in turn, across the board.

APPENDIX II

DEFLATION OF INVENTORY INVESTMENT : SOURCES AND METHODS

II.1. Sources

a) Current Value Inventory Investment

a1) A set of detailed estimates for 1924-28, in G Keiser and B Benning, Kapitalbildung und Investitionen ... pp 45, 50, 55, 60, 65, 69, 75, 93, 110, 134, 145, 139.

a2) A set of revised estimates for 1924-29, disaggregated only to the industry group level, in Wi.u.Stat. 1938 p 33, and in St.Jb.f.d.Dt.R. 1938, p 565.

b) Price Indexes

These are to be found in one or more of the following:
St.Jb.f.d.dt.R. 1926 p 259; 1927 pp 297-303; 1928 p 345; 1931 pp 259-263.
Konj.Stat.Hdb. (1936) pp 99-108, 288, 289, 318, except for the deflators of the following two specially constructed indexes:

Lignite: in the St.Jb.f.d.dt.R.1930 p 104 there is data on the volume and value of output: (i) crude lignite and (ii) briketts etc. Thus for each an implicit price per tonne can be found. The ratios of the volumes (i):(ii) is constant at c.3:1. Assuming that the composition of stocks reflects that of output (though they are successive, not parallel processes) the two indexes were joined in the ratio 3:1 to provide the desired index.

Potash and Salt: in the St.Jb.f.d.dt.R. 1930 p 106 value and volume series can be found for (i) crude potash output, (ii) crude common salt

output, (iii) processed potash output, (iv) processed salt output, and (v) potash and salt utilised in calcium chloride plant etc. The most significant structural change over 1925-29 is the variation in the output of salt (crude and processed) relative to that of potash. Therefore I constructed a combined index by ammalgamating the crude potash and crude salt prices implicit in the above-mentioned tables in the following ratio for each year:

Year	1925	1926	1927	1928	1929	1930
Ratio (potash:salt)	6.8:1	4.8:1	4.9:1	5.2:1	5.2:1	4.9:1

To the extent that both for potash and salt implicit crude prices rose faster than processed prices, this index may have an upward bias.

Below I provide a classification of the price indexes. Two-digit indexes are components of one-digit indexes; three-digit indexes of two-digit etc. A small roman numeral means a regrouping of certain elements of the 'parallel' arabic digit indexes; eg elements of 4.1.(i) are found in 4.1.1. and 4.1.2. The two specially constructed indexes just described are denoted by the addition of a lower case letter.
The following classification can easily be matched with the lay-out of indexes in the sources listed above.
Only the two specially constructed indexes are reproduced.

Classification of Prices Indexes

Aggregate Wholesale Price Index

1.1 Agricultural Foodstuffs

1.2 Livestock

1.3 Livestock Products

1.4 Feedstuffs

2. 'Colonial' Products

3. Aggregate Industrial Raw Materials and Semimanufactures.

3.1 Coal (Hard and Lignite)

3.1.a Lignite[1] : Annual Average Values

1924	1925	1926	1927	1928	1929	1930
11.43	97.8	98.0	99.0	100.0	101.7	102.9

3.2 Iron Raw Materials and Semi-manufactures

3.3 Non-Ferrous Metals, Raw Materials and Semi-manufactures

3.4 Textile Raw Materials and Semi-Manufactures

3.5 Hides and Leather

3.6 Chemicals

3.6.a Potash[2] : Annual Average Values

1924	1925	1926	1927	1928	1929	1930
74.1	73.6	81.1	91.5	100.0	97.2	97.2

3.7 Artificial Fertilisers

3.8 Energy Oils and Lubricants[3]

3.9 Rubber

3.10 Paper Raw Materials and Paper

3.11 Building Materials

3.11.1 Building Wood

4. Aggregate Industrial Finished Goods

4.1 Aggregate Industrial Finished Producer Goods

4.1.1. Agricultural Equipment

4.1.2 Industrial Equipment

4.1.(i) Machinery

4.1.(i)1 Agricultural Machinery

4.1.(ii) Vehicles[4]

4.2.1 Textile Goods and Materials

4.2.1.1 Knitted Goods[5]

4.2.2 Shoes

4.2.3 Household Goods

5.1 Cost of Living Index less Accommodation Costs

5.1.1 Retail Food Prices

5.1.2 Retail Clothing Prices

5.1.3 Retail Heating and Lighting Costs

5.1.4 Retail Costs of Miscellaneous Household Requisites and Transportation.

Footnotes to Classification

1 1924 price estimated by extrapolation of 1925 figure with aid of index 3.1 .

2 1924 price estimates by extrapolation of 1925 figure with aid of index 3 .

3 This index replaced an earlier one ('technical oils and fats'). The 1924 data for this latter index were multiplied by 0.714 to obtain 1924 values for 3.8 .

4 This is a simple average of the Stat.Reichsamt price indexes for freight and for passenger vehicles.

5 1924 price estimated by extrapolation of figure for first quarter of 1925 with the aid of index 4.2.1 .

II.2 Methods of Deflation

As already stated in the citation of sources, the current value inventory investment data come in two forms: the original estimates of Keiser and Benning, and the revised estimates of the Stat.Reichsamt. I decided to work with the former in the first instance, because these results are

published in a finer industry classification than are the latter; also because only the former publication also gives any indication of stock levels.

Since the current value data includes inventory valuation adjustment, the correct procedure is to cumulate the estimates of stock levels at 1.1.24 (the only date for which Keiser and Benning publish levels) with successive estimates of current value investment, thus obtaining a series of estimates of stock levels pertaining to every year-end. These should then be deflated appropriately; and the first differences would be the desired 'real' inventory investment estimates.
Unfortunately, Keiser and Benning, in the cases of mining and manufacturing, and public utilities, only publish inventory level estimates pertaining to the investigated sample. It can be shown that the correct procedure is to gross these stock level estimates up to apply to the entire industry group with the aid of some extrapolation factor, then cumulate year-end inventory level estimates at the industry level as just described. Keiser and Benning publish inventory investment estimates both for the samples and for the entire industries; a representative extrapolation factor could be assessed from the factors implicit in these data.

Commodity Weighting of Deflators

I list below each of the industries into which Keiser and Benning disaggregate their data, together with

(i) the extrapolation factor just described, ('E' Factor) and

(ii) the combination of deflators I used in each case, together with their weighting. The attached numbers refer to the classification

of prices indexes on pp 4004 above.

Industry		'E' Factor*	Deflators		Weighting
I	Heavy Industry				
I(i)	Hard Coal, Iron Steel)	1.17	3.1 3.2	Coal ... Iron ...	0.5 0.5
I(ii)	Lignite	1.30	3.1.a.	Lignite	1.0
I(iii)	Non Ferrous Metals	1.33	3.3	Non Ferrous	1.0
II	Chemicals				
II(i)	Chemicals (Producer Goods**)	1.60	3.6 3.7	Chemicals Fertilisers	0.5 0.5
II(ii)	Industrial and Vehicle Oils	1.40	3.8	Energy Oils	1.0
II(iii)	Potash	1.40	3.6.a.	Potash	1.0
III	Various Producer Goods				
III(i)	Paper	2.20	3.10	Paper ...	1.0
III(ii)	Building	6.90	3.11	Building Materials	1.0
III(iii)	Building Materials	3.50	3.11	Building Materials	1.0
III(iv)	Rubber, Asbestos	1.30	3.9 3.	Rubber Industrial Raw Materials	0.5 0.5
III(v)	Saw Mills	9.00	3.11.1	Building Wood	1.0
III(vi)	Leather, Leather Goods	3.40	3.5	Hides and Leather	1.0

* Extrapolation Factor

** incl. IG Farben Consumer Goods

Industry		'E' Factor*	Deflators		Weighting
IV	**Engineering**				
IV(i)	Electrical Engineering	1.40	3.2	Iron ...	0.5
			4.1.(ii)	Industrial Equipment	0.33
			3.3	Non Ferrous Metals	0.17
IV(ii)	Mechanical Engineering	2.25	3.2	Iron ...	0.75
			4.1(i)	Machinery	0.25
IV(iii)	Vehicles, Tractors	1.55	3.2	Iron ...	0.5
			4.1.2	Vehicles	0.5
IV(iv)	Cycles, Motor Cycles	2.40		As for IV(iii)	
IV(v)	Railway Locomotives, Rolling Stock	1.10		As for IV(ii)	
IV(vi)	Shipbuilding	1.10		As for IV(ii)	
V	**Textiles**				
V(i)	Cotton**	2.80	3.4	Textiles ...	1.0
V(ii)	Wool**	3.50	3.4	Textiles ...	1.0
V(iii)	Linen, Hemp etc**	1.90	3.4	Textiles ...	1.0
V(iv)	Other Spinning and Weaving	3.10	3.4	Textiles ...	1.0
V(v)	Other Textiles	6.50	3.4	Textiles ...	0.67
			4.2.1.1	Knitted Goods	0.33
V(vi)	Rayon	1.30	3.4	Textiles	1.0
V(vii)	Clothing	20.00	3.4	Textiles ...	0.5
			4.2.1	Textile Finished Goods	0.5
V(viii)	Shoes	3.30	3.5	Hides and Leather	0.67
			4.2.2	Shoes	0.33

* Extrapolation Factor

** Spinning and Weaving

Industry		'E' Factor*	Deflators		Weighting
VI	Food, Drink, Tobacco	2.92	1.1	Agricultural Foodstuffs	0.5
			1.3	L'stock Products	0.38
			2	Colonial Foods	0.12
VII	Miscellaneous Consumer Goods	4.04	3	Industrial Raw Materials**	0.80
			4.2.3	Household Goods	0.20
VIII	Public Utilities	2.0	3.1	Coal ...	0.67
			3.2	Iron ...	0.17
			3.11	Building Materials	0.17
IX	Transport and Communications	1.0		As for VIII	

In the case of other sectors, Keiser and Benning did not investigate by means of balance sheet analysis; so for the following their estimates of inventory levels at 1.1.24 refer to the entire sector.

Sector or Branch	Deflators		Weighting
X The Artisan Sector		The Wholesale Price Index	1.0
XI Wholesale Trade			
Iron and Steel	3.2	Iron ...	1.0
Coal	3.1	Coal ...	1.0
Machinery	4.1.1	Machinery	1.0

* Extrapolation Factor

** This index was adjusted by replacing component index 3.4 Textiles ... by 3.11.1 Building Wood, with the same weighting.

Sector or Branch	Deflators		Weighting
Building Materials	3.11	Building Materials	1.0
Yarn	3.4	Textile Raw Materials	1.0
Leather, Hides, Rubber, Linoleum	3.5	Leather, Hides, Rubber	0.88
	3.9	Rubber	0.12
Wood	3.11.1	Building Wood	1.0
Agricultural Products	1.1	Agric. Foodstuffs	0.33
	1.4	Feedstuffs	0.33
	3.7	Fertilisers	0.33
Agricultural Machinery	4.1.(i).1	Agricultural Machinery	1.0
Vehicles	4.1.(ii)	Vehicles	1.0
Textile Goods	4.2.1	Textile Goods ...	1.0
Shoes etc	4.2.2	Shoes	1.0
Food, Drink, Tobacco	1.1	Agric. Foodstuffs	0.5
	1.3	L'stock Products	0.38
	2	Colonial Goods	0.12
Other Consumer Goods	4.2.3	Household Goods	1.0
Miscellaneous Industrial Goods	4.1	Aggregate Industrial Finished Producer Goods	1.0
XII Retail Trade			
Food, Drink, Tobacco, Street Trading, Hawking, etc	1.1	Agric. Foodstuffs	0.5
	1.3	L'stock Products	0.38
	2	Colonial Goods	0.12
Clothing	4.2.1	Textile Goods	1.0
Household and Luxury Goods	4.2.3	Household Goods	1.0
Miscellaneous Requisites	5.1.4	Misc. Household Requisites and Transportation	1.0
Coal	3.1	Coal ...	1.0

'Inter-temporal Weighting' of the Deflators

In all cases the inventory levels at 1.1.24 were deflated by the unweighted average of the relevant prices in the first six months of 1924. Subsequent 'year-end' inventories were deflated each by the three variants described above p 398.

Application of Results to the Revised Stat.Reichsamt Data

I wished the final results of the deflation exercise to pertain to the later, more final Stat.Reichsamt current value data, and used the following method to deflate these:

The estimates of inventory levels at 1.1.24 described above had to be taken over directly, since the Stat.Reichsamt data provide no hints as to their revision. These were aggregated to the industry group, or sectoral level (ie the roman numeral level of pp 404ff), and cumulated with the Stat.Reichsamt data on current value inventory investment to derive current value year-end inventory levels series. These series was deflated by the implicit deflators of the corresponding Keiser/Benning groups or sectors, over the period 1.1.24 to 31.12.28. Keiser and Benning did not carry their estimates forward to 1929. To obtain deflators for stocks at 31.12.29, the component deflators of the corresponding groups or sectors were combined in the weighting implicit therein at 31.12.28.

Taking first differences of the results produced the estimates reproduced in Table 1 p 214 of the text.

APPENDIX III

DEUTSCHE BANK SURVEY

Relationship between Survey Estimates and those obtained here

(The argument of this section is largely in terms of rate of change of stocks or of output. In all cases "rate of change" is defined as the absolute change of the quantity in question, divided by the average of the beginning-and end-of-period quantities.

Reference to Table III/1 below shows that according to the Deutsche Bank survey, inventory levels increased 18% in the period 1926/7 and only 1.8% in 1927/8. By contrast, according to my estimates deflating by July-December/December prices stocks rose by 7.6% in 1927 and by a further 6.4% in 1928. Actually the coverage is not quite identical; my estimates include handicrafts, public utilities and transport and communication, as well as certain branches of manufacturing industry, all of which are omitted by the Deutsche Bank Survey. As it happens, differences of coverage only go a small way to closing the gap.

One vital difference is in the timing. In the Deutsche Bank data the inventory levels are calculated as averages for the whole year. Inventory investment can therefore only be inferred from this data as differences between these year averages, whereas my data on inventory investment refers to calendar years.

Without quarterly or monthly data on inventories however we can infer no more than that this difference in timing will produce some discrepancy between the two series. The only monthly series which we can

Table III/1 Deutsche Bank Survey

Stock Levels and Stock-to-Turnover Ratios 1925-28

NB: In all cases 1925=100. Therefore the 1925 column is omitted.

Industry or Trade Branch	Stocks			Stocks-to-Turnover Ratio		
	1926	1927	1928	1926	1927	1928
Stone and Earth	104	109	116	122	99	104
Iron and Steel	96	105	100	119	99	94
Non-Ferrous Metal	97	115	118	106	94	98
Mech. Engineering	88	105	101	117	100	102
Elec.Eng. and Optical	77	86	92	95	91	86
Chemical	98	124	125	104	97	95
Textiles	86	117	117	105	107	110
Clothing	82	108	112	100	105	116
Leather	92	114	107	111	107	119
Timber	104	132	126	103	98	99
Paper	104	108	108	119	98	98
Foods, etc	93	113	111	104	111	121
Wholesale	99	111	112	98	99	89
Retail	88	104	108	84	101	106
Distribution by Firm Size (Equity Capital)						
Below 1 mill.Rm	98	114	115	115	119	127
1-5 mill.Rm	97	119	89	116	116	128
5-10 mill.Rm	95	99	106	119	105	99
Above 10 mill.Rm	98	101	103	111	101	105
Aggregate	92	113	115	107	102	107

SOURCE: FZ 26.6.29, 'Unrationelle Lagerhaltung'.
(Ultimate: Deutsche Bank)

use are those for stocks of textile raw materials, and of wood for paper mills. (The third - coal stocks - is useless as a general indicator since its behaviour is so heavily influenced by the English Coal Strike). It is interesting to note that for both of these monthly series the (negative) gap between average inventory levels in 1925 and 1926 exceeds the year-end gap in inventory levels, December 1925 and December 1926. Conversely the (positive) gap between annual average inventory levels 1926 and 1927 exceeds the year-end gap December 1926 and December 1927. These are only straws in the wind, but they indicate how the differences in timing could explain part of the gap between the two series, up to the end of 1927.

For 1928 however this factor works in the opposite direction. Our knowledge of the trade-cycle, plus the evidence of these two monthly series indicates that the gap should be the converse of what the figures show: an estimate of inventory investment in the calendar year 1928 should be less than an estimate calculated as the difference between the annual average 1927 and 1928. Instead, the former is greater than the latter.

One hypothesis which may help to reconcile the two estimates for 1928 and 1927/8 will be outlined in aggregative terms first, then explored at the industry level.

As well as providing estimates of inventory levels, the Deutsche Bank Survey provides estimates of stock-to-turnover ratios. Thus estimates of turnover can be inferred. Over a twelvemonth output and turnover are roughly the same. So the inferred turnover figures can be compared with Hoffmann's data on real output in industry and trade, after adjustment to remove the element of commerce, insurance etc in the latter's data. The results are as follows:

Table III/2

	(1) Index of Trade Output	(2) Output of Trade, Commerce etc	(3) Output of Trade etc adjusted	(4) Industry Output	(5) =(3) + (4)
1925	108.0	4634	4642	20579	25221
1926	100.7	4396	4328	18648	22976
1927	122.0	5244	5244	23644	28888
1928	121.1	5370	5197	23703	28899
1929	122.5	5409	5266	24161	29427

SOURCE: Hoffmann ... pp 448, 455.

Column (5) provides my adjustment of Hoffmann's data to provide a series with nearly the same coverage as the Deutsche Bank survey. This estimate can be reduced to index numbers and compared with the aggregate turnover data inferred from the Deutsche Bank Survey.

Table III/3 1928 = 100

	Output (Hoffmann)	Turnover (Deutsche Bank)
1925	87.3	93.2
1926	79.5	80.0
1927	100.0	103.1
1928	100.0	100.0

SOURCE: Hoffmann: See previous table. Deutsche Bank. See footnote to Table III/1.

It can be seen that the two series do not coincide. In general the Deutsche Bank (inferred) series is more volatile.

Suppose we make the arbitrary assumption that the stock-to-turnover ratio in the Deutsche Bank estimates is more representative of all

industry and trade than are the inventory level estimates, and recalculate the aggregate inventory level estimates by multiplying the aggregate stock-to-turnover ratio estimates by the Hoffmann output data, what is the result?

Table III/4 Inventory levels: Manufacturing Industry and Trade

	Original Deutsche Bank	Recalculated Deutsche Bank	My Estimates (July-Dec./Dec. deflator) at 31.12
1925	86.9	87.3	85.2
1926	80.0	85.1	86.7
1927	98.2	102.0	93.1
1928	100.0	107.0	100.0

The recalculated "Deutsche Bank" results can be seen in the middle column. If we ignore the differences in timing, we can see the estimates of inventory investment are brought closer together.

Table III/5 Rate of Inventory Investment: Manufacturing Industry and Trade

	Original Deutsche Bank	Recalculated Deutsche Bank	My estimates (July-Dec./ Dec. deflator)
1925			+7.0
1925/6	-6.9%	-2.6%	
1926			+1.5
1926/7	+18.2%	+18.0%	
1927			+6.4
1927/8	+1.8%	+4.8%	
			+6.9

If we could be sure that the stock-to-turnover ratios in the Deutsche Bank survey were more representative than the inventory level estimates,

we could use the above recalculation as an indication of how the "perverse" gap between the Deutsche Bank 1927/8 estimate and my 1928 estimate might be closed. The differences in timing would reinforce this to close the gap 1925/6 as against 1926, and, more partially for 1926/7 and 1927.

It was found, furthermore, that this hypothesis was broadly confirmed by a branch-by-branch comparison of my estimates of inventory investment in 1928 with the "Deutsche Bank" estimates for 1927-28, in conjunction with a comparison of rate of change of output 1927/8 according to the best available sources with the rate of change of output as inferred from the Deutsche Bank data. Table III/6 on the next sheet sets out the relevant data. Of my estimates of inventory investment in manufacturing industry and trade, all are reproduced except very minor branches like lignite and potash.

The table may be considered as follows :

Firstly: Consider branches included in my estimate but totally excluded from the Deutsche Bank survey. Two of these show an increase appreciably above the increase of my aggregate estimates for industry and trade altogether - ie industrial oils, and especially shipbuilding. The other two show an increase only a little below the average: miscellaneous consumer goods, and vehicles.

Thus it appears that on balance the Deutsche Bank survey omitted (net) above average stock building in 1928.

Secondly: We consider branches for which the Deutsche Bank coverage is expressly incomplete - engineering, and food, drink and tobacco. Food, drink and tobacco exhibits above average growth in my estimates. If one looks at the Keiser and Benning data on which my

Table III/6 Comparison of Rates of Change of Inventories and Output Estimates of Different Sources

	Rate of Change of Inventories (%)		Rate of Change of Output 1927-1928 (%)		
	1928	1927/8			
	My Estimate (July-Dec./ Dec.Deflator)	Deutsche Bank	Hoffmann	Konj. Stat. Hdb.	Inferred from Dte.Bank
Retail	+1.1	+3.8	-0.4	-	-1.1
Wholesale	+6.1	+0.9	-	-	+11.6
Iron/Steel[1]	-3.9	-4.9	-10.5[6]	-5.0[6]	+0.3
Non Ferr.Metal	+17.9	+2.6	+1.9	+5.3	-1.7
Chemicals	+23.6	+0.8	+14.0	+11.1	+2.9
Ind.and Vehic.) Oils)	+9.1	-	-	-	-
Paper	+8.5	0.0	+4.3	+6.0	0.0
Timber[2]	+7.1	-4.7	+0.4[7]	-2.6	-5.7
Leather	+10.9	-6.3	-15.1[8]	-6.0[9]	-17.1
Building	+0.2	-	-4.5	+9.0	-
Stone + Earth[3]	+20.5	+6.2	-2.8	-1.6	+1.3
Elec.Eng.	+12.8	+3.4	-	-	+12.0
Mech.Eng.	+5.7	-3.9	-	+11.1	-5.9
Shipbuild.	+25.2	-	+13.1	+7.0	-
Vehicles	+6.2	-	+20.0	+8.0	-
Textiles[4]	+7.4)	0.0	-2.9	-4.0)	-2.8
Other Textiles	+16.0)		-	-1.7)	
Clothing	-0.2	+4.0	-16.2	-4.0	-6.0
F.D.T.[5]	+9.0	-2.0	+6	+6.0	-10.0
Misc. Consum.Goods	+6.0	-	-	-	-
TOTAL	+7.0	+1.8	-	-	-

NOTES: 1 In my estimates this includes coal mining
2 Corresponding category in my estimates: Saw Mills
3 " " " " " " : Building Materials
4 " " " " " " : Spinning + Weaving
5 ie Food, Drink and Tobacco
6 In this case pig iron
7 " " " leather manufacture. Leather working statistic: -18.9%
8 In this case stone and earth
9 " " " building materials

SOURCES: Inventories: My Estimates See Appendix II: Table III/1 above.
Output: W G Hoffmann op.cit.pp 354,358,362,373,385,392-3 431.
Konj-Stat.Hdb.(1936) pp 49-50, 251.
Deutsche Bank: inferred from Table III/1 above

estimate is based, it appears that the sub-branches of food etc omitted by the Deutsche Bank survey (brewing, tobacco, and grain-milling) probably exhibited net above average stock accumulation in 1928. As far as engineering is concerned, the Deutsche Bank estimates under-represent branches working to order. I possess no data which distinguishes between production to stock and to order: and a prior reasoning does not give much help. The electrical engineering stock building in my estimate is relatively as much above average as the Deutsche Bank electrical engineering figure is above its average; but my mechanical engineering figure is relatively higher.

The explanation may be doubtful, but the fact is clear, that for branches only partly represented in the Deutsche Bank data, taken together, my estimates are relatively higher than the Deutsche Bank estimates. Furthermore, for both mech.eng. and food etc, the Hoffmann and Konj-Stat.Hdbuch estimates of rate of change of output exceed those inferred from the Deutsche Bank Survey.

Thirdly: Compare branches which in principle are covered by both my estimates and the Deutsche Bank survey.

Of these, only two series in my estimates exhibit a lower degree of inventory investment than the corresponding Deutsche Bank series. According to all available series the rate of output or sales fell in these branches, and the rate of decline was as fast or faster acoording to the Hoffmann series, as according to that inferred from the Deutsche Bank survey.

For Iron and Steel both my estimates and the Deutsche Bank estimates show roughly the same change in inventories. Output fell according to the Hoffmann data: rose a little as inferred from the Deutsche Bank survey.

For all other branches represented in both series - eight in all - my estimates exhibit greater increase in inventories than does the corresponding Deutsche estimate. One of the most outstanding of these - Chemicals - is due to the stockbuilding policies of I.G. Farben - which the Deutsche Bank survey clearly failed to capture *1. Of these eight series, Hoffmann and the Konj-Stat-Hdb. provide output series for all except wholesale trade. For the seven left, in four cases rate of change of output is higher according to these sources than as inferred from the Deutsche Bank survey - ie chemicals, non-ferrous metals, paper and timber.

In 2 cases the rate of change of output is similar in all sources - ie textiles and leather. In 1 case the inferred rate of change of output from the Deutsche Bank survey is higher than that in other sources - ie building materials / stone and earth.

To sum up the branch-by-branch analysis of the two estimates of inventory investment and related estimates of output change for 1927/8 and 1928:

(i) Those branches totally omitted by the Deutsche Bank survey display on balance in my estimates a rate of inventory investment which is above average even in relation to the rest of my estimates.

(ii) For branches for which Deutsche Bank estimates are explicitly incomplete, my estimates exceed the Deutsche Bank estimates; furthermore the directly obtained estimates of output change (Hoffmann and Konj-Stat-Hdbuch) exceed those inferred from the Deutsche Bank data.

(iii) For branches in which the coverage of my estimates and those of the "Deutsche Bank" survey are in principle the same, the following broad correlation is observable: where my estimates of inventory

*1 Keiser und Benning op.cit. p 50.

investment exceed the Deutsche Bank estimates, directly ascertained estimates of the rate of change of output exceed those inferred from the Deutsche Bank survey. Where my estimates of inventory investment are less than those of the Deutsche Bank survey, the converse is true. While not perfect, the correlation seems closer than can be explained as chance. This branch-by-branch correlation confirms the aggregative hypothesis advanced above: viz that if we regard the stock-to-turnover ratios as more representative than the inventory level estimates and recalculate the levels on the basis of these ratios multiplied by the best available output data, the gap between my estimates and those of the Deutsche Bank survey is substantially reduced.

It seems possible that these three items could close the gap between my estimates for 1928 and those of the Deutsche Bank survey for 1927/8 perhaps, even allowing for the gap-widening effect of the difference in periodisation.

It may be said in conclusion that the 18% rise in real inventory levels 1926/7 - as stated by the Deutsche Bank survey - seems unplausibly high by any criterion.

APPENDIX IV

WAS THERE A SYSTEMATIC BIAS IN THE INITIAL BALANCE-SHEET VALUATION OF FIXED ASSETS AFTER THE STABILISATION ?

Almost all firms reconstructed their balance sheets in terms of Goldmark/Reichsmark during the two years after Stabilisation *1. According to the writer of one thesis on the subject, the relevant legislation allowed considerable latitude in the determination of the values of their assets *2. Do the balance-sheet values of fixed assets (from which estimates of the fixed capital stock in Gewerbe are derived) conceal a systematic bias?

What do we mean by "bias"? A reasonable definition seems to be as follows: If the initial balance-sheet values of pre-1914 fixed assets are less than the average 1924-29 replacement costs for identical assets, after allowance for depreciation, undervaluation can be said to have occurred. Vice-versa for overvaluation. How can this definition be applied empirically? In practice all we have to go on are contemporaries' impressions and common sense.

Contemporaries (and historians) who comment on this problem seem to work with roughly this definition. Their method of approach usually seems to be to compare actual declared profit rates, net of depreciation, of firms and industries, with their own subjective assessment of "true" profitability. Where "true" profitability is that which would be yielded

*1 P Mueller, Die Goldbilanzumstellung ... pp 39-40.

*2 Ibid. pp 21ff.

were assets correctly valued, their definition is closely related to mine; so that eg when contemporaries believe declared profits are too high, this by my criterion indicates undervaluation.
However "true" profits sometimes also convey the sense of Marshallian "normal" profits. Where this is so their evidence cannot be directly aligned with my criterion.
There were other approaches to the problem as well of course.

Opinions among those who discuss the problem are fairly uniform. Mueller, the writer of the above-mentioned thesis, concluded that the "initial" revaluation of assets after Stabilisation inadequately reflected the real net investment that had occurred between 1913/24; secondly that on average initial values of assets were lower than would have obtained in 1913 on identical assets (presumably after allowance for price-level change) *3. Maybe, he thought, the less rosy post-inflation economic outlook justified this. Thus Mueller's conclusion seems clearly to imply undervaluation by my definition. This is also, in the main, the view of Keiser and Benning, especially with respect to industries predominantly populated by smaller firms *4, but also for heavy industry *5; however in the case of mechanical engineering they advance a hypothesis of overvaluation, in the light of the subsequent severe and endemic excess capacity and low profitability of that branch *6. Thus it does appear that Keiser and Benning's criterion of "true" profit-

*3 Ibid. pp 73-4, 90ff.

*4 Keiser and Benning op.cit. p 176.

*5 Ibid. p 44.

*6 Ibid.p 51; Undervaluation is also supported by B Benning, 'Der schwarze Freitag ...' p 114.

ability is Marshallian; hence we can probably adopt their evidence of undervaluation directly, but their understanding of overvaluation in mechanical engineering might for us imply accurate valuation. This conclusion for mech.engineering is supported by A Oeser, who holds that the industry valued its assets during 1924/5 at full production value, a decision proved erroneous by subsequent excess capacity *7.

Other opinions diverge. A writer on German mechanical engineering in "Commerce Reports" believed that assets were deliberately undervalued to minimise the burden of the reparations bonds *8. Certainly it is true that these obligations were being determined contemporaneously with the balance sheet revaluation. On the other hand Treue holds that the steel firm Ilseder Hütte "undoubtedly valued its fixed assets very high" in the initial balance sheet, in order subsequently to generate large depreciation allowances. Other disadvantages of this policy were not considered *9.

In a general scholarly survey, F Schmidt subscribed to a view of general undervaluation during 1924/5 *10.

Thus the consensus of this small sample is: undervaluation; the sole dissenter being Treue. I think we can view the consensus as evidence of undervaluation by my criterion.

Common sense seems to support this view anyway.

*7 A Oeser, "Kapital und Ertrag im deutschen Maschinenbau", Wirtschaftliche Hefte der Frankfurter Zeitung, Feb.1928.

*8 Commerce Reports, 27/2/28,"German Machinery Industry and Trade".

*9 W Treue,op.cit.p 500; DBZ 15/2/29,p5,"Die Lage im Ruhrkohlenbergbau".

*10 F Schmidt, 'Die Faktoren des industriellen Kapitalbedarfs', p129. For other support of this view (excepting the case of the public electricity supply) see E-A 111/2, Die deutsche Elektrizitätswirtschaft pp 63-4.

i) Accounting practice uniformly advocates conservative valuation of assets. Given a reasonably free hand, firms will seek to minimise risk by so doing, subject to a desire not to exaggerate profits too much, and hence incur needless taxation. The rationale suggested by W Treue surely implies much more subtlety on the part of most businessmen than this view does.

ii) In fact the years 1924/5 were years of less than prosperity, of rapid alterations in the trade cycle etc. 1923 had been a chaotic year. Such a recent past surely makes the likelihood very high, that businessmen revalued their assets conservatively.

iii) The fears of the burden of the reparation bonds surely worked in the same direction.

Thus in Chapter 8, I will assume:

a) That the values of fixed assets in the "initial" balance sheets of 1924/5 were on average correct or too low.

b) If there is any systematic difference in the degree of bias,[2] larger firms are more likely to exercise the subtlety, (and be less apprehensive of bankruptcy) than small firms. Therefore the smaller the average size of firm in an industry, the more the likelihood of undervaluation.

Assumption a) implies:

1) That initial (1924/5) capital stock estimates may be too low. But net investment estimates 1924ff. may be generally too high (because depreciation rates - either firms' own or researchers' - may be too low).

Assumption b) would imply if accepted:

2) That estimates of net investment 1924ff. for industries populated by large firms may be too low relative to estimates for industries populated by small firms.

APPENDIX V

ESTIMATES OF THE UTILISATION OF THE FIXED CAPITAL STOCK

V.1 Summary of Notation
V.2 Critique of the Method of A F Mester
V.3 Brief Critique of the Method of R Krengel
V.4 Description of Revised Method
V.5 Further Evidence on the Capital-Labour Ratio 1924-28
Summary of the Argument
V.6 Statistical Tables

V.1 SUMMARY of NOTATION

Let E = the numbers employed in Gewerbe

e = the rate of employment in Gewerbe (= est.(E/L))

j = the "lower limit" estimate of the "jobs reporting index" (= est.(E/L^*))

$\bar{j}$ = the "upper limit" estimate of the "jobs reporting index" (= est.(E/L^o))

K^* = the aggregate extant fixed capital stock in Gewerbe - ie both in use and idle.

K = the aggregate fixed capital stock in Gewerbe currently in use.

L^* = the level of employment associated with the technically maximum utilisation of K^*

L^o = the level of employment associated with the technically optimum utilisation of K^*.

L = the total numbers currently in, and seeking employment in Gewerbe

O = net output in Gewerbe

r = K/E: the capital-labour ratio pertaining to the capital stock currently in use in Gewerbe

$\frac{K}{O}$ = the capital-output ratio pertaining to the capital stock currently in use in Gewerbe.

est ( ) = estimate of ( )

min ( )$_t$ = minimum value of ( ) during period defined for t .

V.2 CRITIQUE of the METHOD of A F MESTER

There are two published measures of the utilisation of the fixed capital stock: that of A F Mester and that of R Krengel *1.

Mester's measures refer to the capital stock of the entire economy. I discuss therefore his method as it would apply either to Gewerbe as a whole, or to manufacturing and mining on their own. In his view, furthermore, variations in utilisation concern only the stock of capital equipment, not the stock of buildings (Mester, pp 72-3). This view is however irrelevant to his method.

For the years 1928-36, Mester adopts directly a series evolved by the Institut für Konjunkturforschung, which I have nicknamed the "jobs reporting index". A variant of this index is reproduced in Table F p 437 below. The series indicates the actual levels of employment as percentages of the maximum levels of employment which the extant capital stock could afford; it is based on comprehensive sample surveys (Mester pp 66-7). Using the notation defined in section V/1 :

$$\text{est}\left(\frac{E}{L^*}\right) = j$$

A number of assumptions would have to be made before this series could be viewed as an accurate index of the degree of utilisation of the fixed

*1 A F Mester, 'Eine Zeitreihe der Ausnutzung ...'
R Krengel, 'Anlagevermögen ...' pp 86-89.

capital stock in "Gewerbe".

Firstly, an assumption not made explicit by Mester: that the capital-labour ratio pertaining to the idle stock must be identical to that pertaining to the stock in use; ie

$$(1) \quad \frac{E}{L^*} = \frac{K}{K^*} \text{ only if } \frac{K}{E} = \frac{K^*}{L^*} = r$$

The assumption set out in (1) is not strictly supportable. Given the well-attested evidence of a secular increase in the capital-labour ratio, (eg Hoffmann ..., Das Wachstum ... pp 49ff), and the likelihood that the idle stock is on average older than that in use, it seems likely that

$$(2) \quad \frac{K}{E} > \frac{K^*}{L^*}$$

If, for example, the "jobs reporting index" stands at 90%, but the average capital-labour ratio appropriate to the idle stock is only half that appropriate to the stock in use, the true degree of utilisation of the capital stock is 94.7%. If the average life of the stock is 20 years, this implies an annual rate of increase of the capital-labour of c.4%. This seems a fairly fast rate of increase, so this arithmetical example can probably be regarded as providing an upper estimate of the degree of distortion caused on this account by the use of the "jobs reporting index" to indicate capital stock utilisation.

A second assumption, implicit in the use of the index as a proxy is more fully discussed by Mester (pp 59ff). The index is, as already stated, expressed as a percentage of the maximum employment potential of the extant capital stock. But it seems likely that the maximum will exceed the optimum employment (and corresponding level of utilisation of the stock). Businessmen probably regard their fixed capital stock as insufficient (quite apart from its technical obsoleteness) and in need

of extension some way below its maximum capacity operation. Mester therefore provides two limiting indices of capital stock utilisation. The first identifies the optimum with the maximum:

Lower Limit: $L^* = L^o$; est $(\frac{K}{K^*}) = j$

To get the second he views the employment level associated with optimum operation as 80% of that associated with the maximum:

Upper Limit: $L^o = \frac{4}{5}L^*$; est $(\frac{K}{K^*})$ = est $(\frac{E}{L^o})$ = $\bar{j} = \frac{5}{4}j$

It is with this upper limit that I work because I wish my utilisation measure to provide an 'upper bound' on the true utilisation rate. I think this 'upper limit' measure will provide such a bound if in discussing the relationship between "optimum" and "maximum" we exclude the possibility that much marginal plant pressed into service at times of high demand may be obsolete and hence undesirable, and concentrate on the fact that "maximum" utilisation may mean more frequent maintenance, less "slack" in the case of breakdowns, and similar factors. Then it does seem extreme, to view "optimum" as as low as 80% of "maximum".

And it is appropriate to view to the context of section 8.3., where this measure of utilisation is required, to exclude factors of technical obsoleteness, since these aspects are considered separately in another section.

Hence it seems to me, that Mester's "upper limit" variantis indeed an upper limit estimate of the utilisation of the fixed capital stock, even allowing for the bias in the opposite direction implicit in the non-fulfilment of the condition in expression (1). The substitution of L^o for L^* in (1) is the crux, and formally speaking I hypothesise that

(3) $\bar{j} \geq \frac{K}{K^*}$ because I believe that

(1a) if L^o is constrained to $\frac{4}{5}L^*$, then $\frac{K}{E} \leqslant \frac{K^*}{L^o}$

and hence $\frac{E}{L^o} \geqslant \frac{K}{K^*}$

I therefore deem it safe to use $\bar{j}$ as a test of the hypothesis of section 4.1; viz that throughout 1924-29 capacity was significantly underutilised.

One final assumption implicit in the use of the index as a proxy for Gewerbe should be considered. The index is based on information from mining and manufacturing only. These are the most cyclical parts of Gewerbe. For the depression years therefore this index is likely to understate utilisation in the sector as a whole. One solution is that of Mester, ie to apply the index to equipment only, and to combine the equipment utilisation thus calculated with assumed 100% utilisation of the buildings stock. However in my case, I doubt whether the application of the index to the entire capital stock in Gewerbe will produce significant understatement for 1928-29 (the only years where I make direct use of the index); in any case, much of the discussion in the text hinges on developments specifically in mining and manufacturing, because these branches also were responsible for the most cyclical components of fixed investment.

Hitherto Mester's methods only for 1928ff have been considered. For 1925-27 he obtained estimates by extrapolating a regression of the "jobs reporting index" on the rate of employment, for which he finds a close fit for the years 1928-36. The function he fits over 1928-36 is:

(4) $\bar{j} = a + be + u$

where a is a constant, b a parameter, and u the random error.

He uses this function to obtain estimates of $\bar{j}$ from estimates of e which he has for 1925-27.

This method is surely faulty. Confining our attention to Gewerbe (purely for the sake of conformity with the definition of the notation in V.1), the "structural equation" which he fits can be written:

$$(4a) \quad \frac{E}{L^o} = c + d\frac{E}{L} + v$$

where c, d, and v correspond to a, b, and u.

There seems no good reason why the relations expressed in (4a) should generally hold. L^o is a function of the size and technical characteristics of the capital stock and the capital=labour ratio; L of demographic and long-term structural shifts; E of the state of the trade cycle. The excellent fit which Mester obtained for 1928-36 is a fluke, and is owing to the fact that in these years L^o and L were practically constant, so that in effect he was regressing E upon a linear transformation of itself. Given that for short periods L^o depends closely on K*, a glance at estimates of K* and L for 1925-35 will show why this regression worked for 1928-36, but would not hold for 1925-29; Gehrig's capital stock data and corresponding labour force data are shown because these are as close as possible to what Mester himself used:

ESTIMATES of the EXTANT CAPITAL STOCK and NUMBERS IN and SEEKING WORK ENTIRE ECONOMY; Mill. 1954 M./Mill. Persons

	K*	L
1925	176	26.6
1929	207	27.8
1933	211	27.0
1935	217	27.6

SOURCES: K* : Gehrig op.cit. p 56.
L : Phelps Brown and Browne op.cit. p 382, Cols 1 and 2.

An alternative method of obtaining estimates for 1924-27 will be described in section V.4.

V.3 A Brief CRITIQUE of the METHOD of R KRENGEL

Krengel's data will be described along with other data in section V.4. His method can be briefly sketched.

He postulates that the "true" capital-output ratio is constant over 1925-56, where the "true" ratio is defined as that pertaining to that fixed capital stock actually in use, and current output. He estimates this "true" capital-output ratio by the lowest ratio between the extant fixed capital stock and current output over 1925-56. Applying the notation of V.1 to mining and manufacturing alone (the coverage of Krengel's estimates) we can write:

$$(5) \quad \text{est}\left(\frac{K}{O}_t\right) = \min\left(\frac{K^*}{O}_t\right), \quad t = 1925 \ldots 1956$$

For any year i, the capital stock actually in use is therefore estimated thus:

$$(6) \quad \text{est}\,(K_i) = O_i \cdot \min\left(\frac{K^*}{O}_t\right), \quad t = 1925 \ldots 1956$$

and the rate of utilisation of the fixed capital stock in year i by:

$$(7) \quad \text{est}\left(\frac{K_i}{K^*_i}\right) = \frac{O_i \cdot \min\left(\frac{K^*}{O}_t\right)}{K^*_i}, \quad t = 1925 \ldots 1956$$

The basic postulate of this method seems open to question, viz that the "true" capital-output ratio is constant for so long a period. Rather it seems to be subject to irregular long period movements (Hoffmann ..., Das Wachstum ... pp 47ff). In any case it seems better to exploit the

directly relevant information of the IfK. "jobs reporting index" for the years for which it is available.

V.4 DESCRIPTION of a REVISED METHOD of APPROACH

I seek an index of the utilisation of the fixed capital stock 1924-29 for Gewerbe as a whole and for mining and manufacturing on their own. As already indicated, for 1928-29 Mester's "upper limit" variant of the "jobs reporting index" will be used.

(8) for 1928-29, est $(\frac{K}{K^*}) = \bar{J}$

For 1924-27 the following method is proposed. To estimate the ratio K/K* we seek separate estimates of K and K*.

For estimates of K*, we use i) for Gewerbe as a whole the series in Hoffmann. Ideally, a more "gross" measure of the fixed capital stock might be better, as this should better represent the development of output potential, but none is available. Hoffmann's is really a year-end series. Successive estimates were therefore averaged to obtain a mid-year series. This will be found in Table E(i) on p 437 below.

ii) for mining and manufacturing on their own we have Krengel's estimates of gross capital stock (ie the cumulation of gross investment minus scrapping at constant prices - Krengel pp 86-7). See Table E(ii) p 437 below.

Estimates of K, the fixed capital stock actually in use, can be obtained with the aid of the identity:

$$K = rE$$

if independent estimates of E and r can be found for 1924-27.

Estimates of E - current employment in Gewerbe (or in mining and manufacturing) are taken from Hoffmann. See Table H p 437.

Estimates of r - the capital-labour ratio pertaining to the capital stock in use have to be devised.

On the basis of the discussion of offsetting biases in section V.2, let us assume that for 1928 the "jobs reporting index" (upper limit variant) provides an accurate estimate of the rate of utilisation of the fixed capital stock in that year. For 1928

$$K = \overline{jK^*}$$

Therefore, also for 1928

$$(9) \quad r = \frac{\overline{jK^*}}{E}$$

This method of estimation of r can be repeated for each of the years 1928-36. The results will be found in Table K(i) and (ii) p 439 A short excursus on the pattern they exhibit is necessary. The first observation is that the ratio appears to vary concyclically over 1929-35. This is spurious, and two errors in the estimation of r according to expression (9) help to produce it:

a) j refers to industry, the most cyclical part of Gewerbe, as already stated. Hence jK* will decline more than K (of which it is an estimate) really does during the depression.

b) My estimate of E will decline less than employment in "Gewerbe" really does, since it takes account only of numbers employed, not hours worked.

The second observation is that the capital-labour ratio appears to be higher for later years of high employment (ie after 1936) than for earlier years of high employment (ie 1928-29). This can be taken as

evidence of the well-observed secular upward trend in the ratio (cf Hoffmann ..., pp 49ff). According to Hoffmann, between 1850 and 1913 the average annual rate of increase of this ratio was, for "Gewerbe" c.2% (op.cit. p 50)

With the aid of these two observations on the observed pattern of r for 1928-36, I turn to its estimation for 1924-27.

I am really interested in showing that even in high employment years (1925, 1927) the capital stock was underutilised. The cyclical problem in the estimation of r can therefore be ignored.

As a limiting assumption we can say that in no year 1924-27 would the capital-labour ratio be higher than in 1928. This assumption is based not only on the above-mentioned secular trend, but also on the likely effects of post-inflation readjustment and "rationalisation" on r.

On the other hand, the capital-labour ratio could have been increasing over 1924-27.

On these grounds I used three different assumptions to determine the values of the ratio over 1924-27:

a. That the capital-labour ratio was constant 1924-28.

b. That the capital-labour ratio rose at ½% p.a. 1924-28.

c. That the capital-labour ratio rose at 3% p.a. 1924-28.

Remembering that what we wish to calculate is

$$(10) \quad \text{est}\left(\frac{K}{K^*}\right) = \frac{rE}{K^*}$$

it can easily be seen that for 1924-27 assumption "a" maximises the bias against the hypothesis I wish to sustain. From Hoffmann's evidence mentioned above, the true rate of increase of the ratio was probably about 2% p.a.

The results of calculating the rate of utilisation of the fixed capital stock according to (10), and for each of the three assumptions as to the behaviour of the capital-labour ratio 1924-28 are given in Table C p 436 below:

(i) For "Gewerbe", where the index is calculated for the entire capital stock - ie buildings and equipment.

(ii) For mining and manufacturing, buildings and equipment together.

As a sort of footnote to this section of the appendix, I consider the effect on the utilisation index of errors in the estimates of the extant fixed capital stock (K*). I assume that the error chiefly arises out of the process of re-valuation after the inflation (see Appendix IV); by contrast that estimates of gross investment from 1924 are accurate. Expressions (9) and (10) show that errors in K* effect estimates of the utilisation rate both directly, and indirectly as they affect r via their effect on the capital stock estimate for 1928. These two effects will offset each other. We can expect that the utilisation index will therefore not be very sensitive to errors in K*. Our assumed pattern of error implies however that capital stock estimates become more accurate through time. For 1924-27 this implies that the error imported into the index through r will be proportionately less than that imported directly via K* in the denominator. Given the conclusion of Appendix I - viz that at 1924 the capital stock was probably undervalued, this implies that the utilisation estimate is probably slightly biased against the hypothesis of the chapter, by the error in K*. Even if the stock were over- valued in 1924 by, let us say 10%, calculations on Krengel's gross measurement of the stock indicate that the 1925

utilisation rate should only be ½% higher than in Table C(iii); the 1927 rate less than 0.1%. (Calculations on Hoffmann's net measures would be harder, because the implicit depreciation rate would have to be adjusted also, but the conclusion would certainly be the same). Thus we can conclude (a) that the utilisation index 1924-27 is insensitive to errors in the estimates of the extant fixed capital stock (after 1928 the extant stock ceases to enter the calculation); (b) to the extent there is an error, it probably biasses the index against the hypothesis of the chapter.

V.5 FURTHER EVIDENCE on the CAPITAL-LABOUR RATIO 1924-28

Finally, I consider the patterns shown by three interrelated ratios reproduced in Tables I, J, and K below pp 438-9 , ie

The capital-output ratio (Table I). Note that this is defined as K/O not as K*/O, as pertaining to capital-stock in use, not extant, divided by current output.

Output per occupied person (Table J); ie O/E.

The capital-labour ratio (Table K); ie r = K/E; not K*/E.

Each of these is shown both for Gewerbe as a whole, and for mining and manufacturing. The data sources are indicated under the Tables.

To calculate the capital stock in use 1924-27 we use the identity K = rE. Hence for 1924-27 three different estimates of the capital-output ratio are shown, corresponding to the three different assumptions about the behaviour of r.

These three ratios are logically interrelated:

$$(11) \quad \frac{O}{E} = \frac{K}{E} \cdot \frac{O}{K} \quad \left(= \frac{r}{K/O} \right)$$

Thus, given O/E, the higher the capital-labour ratio, the higher also the capital-output ratio. This also can be verified from the Tables for 1925-27.

This interrelation affords corroborative evidence by which to discriminate between the three hypothesised patterns of the capital-labour ratio 1924-27.

If assumption "a" is examined it is seen to imply a capital-output ratio in 1925-26 that was noticeably out of line with all subsequent values. The big drop in this ratio after 1926 could be ascribed to the "rationalisation" boom (on the assumption that this affected the capital-output, but not the capital-labour ratio!) If my conclusions in pp 317 ff of Chapter 8 are accepted, viz that this boom was of modest proportions, then it is more reasonable to suppose that these "maverick" figures in Table I(i)(a) or I(ii)(a) for 1925-27 are statistical artifacts. Even if assumptions "b" or "c" about the pattern of r are employed, K/O still falls after 1925, (as the fact of the "rationalisation" boom might lead us to expect), but at a more plausible rate.

Turning to the estimates of the <u>capital-labour ratio</u> itself, in Table K, and ignoring the artificially induced concyclicality of the years 1929-35, already discussed, the improbability of assumption "a" is evident, which constrains the ratio to constancy during 1924-28, as against assumptions "b" or "c". Examination of the patterns of the capital-output and capital-labour ratios therefore reinforces the view that the latter ratio increased steadily 1924-28.

V.6 UTILISATION RATES : STATISTICAL TABLES

General Key to Symbols at Heads of Columns

(i) Coverage: Gewerbe; fixed capital stock, buildings and equipment.

(ii) Coverage: mining and manufacturing; fixed capital stock, buildings and equipment.

a. Assumes that the capital-labour ratio was constant 1924-28.
b. Assumes that the capital-labour ratio rose at ½% p.a. 1924-28.
c. Assumes that the capital-labour ratio rose at 3% p.a. 1924-28.

Tables A to C Utilisation Rates of the Fixed Capital Stock

A Mester's Estimates
Entire Economy*

1925	95.1
1926	82.3
1927	89.2
1928-39	See Table F below

B Krengel's Estimates
Mining and Manufacturing**

1925	75	1930	74	1935	76
1926	72	1931	59	1936	84
1927	89	1932	48	1937	90
1928	86	1933	56	1938	94
1929	86	1934	68		

* Equipment only

** Buildings and Equipment

SOURCES A: A F Mester op.cit. p 81; average of cols.9 and 10

B: R Krengel, Anlagevermögen,Production... p 87

C Revised Estimates

	(i) Gewerbe			(ii) Mining and Manufacturing		
	a.	b.	c.	a.	b.	c.
1924	85.5	84.3	76.5	n.a.	n.a.	n.a.
1925	90.2	88.8	82.5	91.4	89.9	83.6
1926	81.4	80.6	76.6	79.8	79.1	75.2
1927	89.9	89.5	87.2	89.9	89.5	87.4
1928-38	See Table F below			See Table F below		

SOURCES: See description of method in preceding sections of this Appendix.

Tables E to H (also K) Data for the Calculation of the Rate

E Fixed Capital Stock Buildings + Equipment

	(i) Gewerbe Mrd 1913 M.	(ii) Mining and Manufacturing Mrd. 1954 DM.
1924	60.9	n.a.
1925	62.4	47.7
1926	64.1	48.3
1927	66.0	49.3
1928	68.3	50.5
1929	70.2	51.2
1930	71.6	51.5
1931	72.0	51.4
1932	71.5	50.6
1933	70.7	49.8
1934	70.7	49.3
1935	71.9	49.1
1936	73.8	49.6
1937	76.7	51.2
1938	80.7	52.8

SOURCES E (i): Hoffmann ... p 245
E(ii): Krengel op.cit. pp 82, 87.

F IfK 'Jobs Reporting Index' (Upper Variant)

	-
	-
	-
	-
	89.6
	88.0
	76.5
	63.4
	52.4
	57.9
	73.1
	79.9
	86.4
	[93.6]
	[98.9]

F: Mester op.cit. p 81, cols. 9 and 10.

G Output

	(i) 'Gewerbe' Mrd 1913 M.	(ii) Mining and Manufacturing Mrd. 1950 DM.
1924	n.a.	n.a.
1925	26.7	36.1
1926	24.6	35.5
1927	30.6	44.4
1928	30.8	43.9
1929	31.4	44.5
1930	27.8	39.3
1931	22.9	32.1
1932	20.0	26.1
1933	22.3	29.1
1934	26.9	34.2
1935	30.9	37.8
1936	34.5	42.0
1937	38.5	46.1
1938	41.9	49.8

H Employment Mill.

	(i) 'Gewerbe'	(ii) Mining and Manufacturing
1924	15.2*	n.a.
1925	16.3	10.7
1926	15.1	9.5
1927	17.2	10.9
1928	17.8	11.1
1929	17.5	10.8
1930	15.9	9.7
1931	13.7	8.3
1932	12.0	7.1
1933	12.6	7.5
1934	14.6	8.7
1935	15.6	9.6
1936	16.8	10.3
1937	17.9	11.2
1938	18.8	11.8

SOURCES G (i): Hoffmann ... p 455, cols 2+3+5
G(ii): Krengel op.cit. p 82.
H (i): Hoffmann ...pp 205-6, cols 2+3+5 (1924 = guess)
H(ii): Hoffmann ... p 195, col 6; p 199 col 15 minus (13+14)

Tables I to K Associated Ratios

I Capital - Output Ratio

(i) 'Gewerbe'

	a.	b.	c.
1925	2.11	2.07	1.93
1926	2.12	2.10	2.00
1927	1.94	1.93	1.89
1928		1.99	
1929		1.97	
1930		1.97	
		.	
		.	
1936		1.85	
1937		1.86	
1938		1.90	

SOURCE (i): Table E(i) times Table C(i) divided by Table G(i)

(ii) Mining and Manufacturing

	a.	b.	c.
	1.21	1.19	1.10
	1.09	1.08	1.02
	0.99	1.01	0.97
		1.03	
		1.01	
		1.00	
		.	
		.	
		1.02	
		1.04	
		1.05	

(ii): Table E(ii) times Table C(ii) divided by Table G(ii)

J Output per Occupied Person

(i) 'Gewerbe'

1925	1.64
1926	1.63
1927	1.78
1928	1.73
1929	1.80
1930	1.75
	.
	.
	.
1937	2.15
1938	2.22

SOURCE (i): Table G(i) divided by Table H(i)

(ii) Mining and Manufacturing

3.37
3.75
4.08
3.94
4.13
4.04
.
.
.
4.18
4.21

(ii): Table G(ii) divided by Table H(ii)

K Capital-Labour Ratio

(i) 'Gewerbe'

	a.	b.	c.
1924	3.45	3.38	3.07
1925	3.45	3.40	3.16
1926	3.45	3.42	3.25
1927	3.45	3.43	3.35
1928		3.45	
1929		3.53	
1930		3.45	
1931		3.32	
1932		3.15	
1933		3.24	
1934		3.55	
1935		3.68	
1936		3.81	
1937		4.00	
1938		4.23	

(ii) Mining and Manufacturing

	a.	b.	c.
	n.a.	n.a.	n.a.
	0.41	0.40	0.37
	0.41	0.40	0.38
	0.41	0.40	0.39
		0.41	
		0.42	
		0.41	
		0.39	
		0.38	
		0.38	
		0.41	
		0.41	
		0.42	
		0.43	
		0.44	

SOURCES (i): Table E(i) times Table C(i) divided by Table H(i)

(ii): Table E(ii) times Table C(ii) divided by Table H(ii)

APPENDIX VI

DID THE INVESTMENT PROGRAMME COME TO A "NATURAL CONCLUSION"?

One conclusion of the chapter is that widespread presence of excess capacity, the relative modernity of plant etc created only weak stimuli to sustain the investment upswing that had begun in 1926. As stated on p 291there exists a fair amount of evidence that contemporary agents and observers believed that the investment boom was diminishing in 1928/9 because capital expenditure programmes were reaching "some sort of a conclusion" (sind zu einem gewissen Abschluss gekommen). The evidence of this belief, reproduced below, is of two types:

(i) An analysis of all relevant information in my possession from company reports. In Table VI.1 Reports attributing the reduction in investment activity within the firm to the ending of programmes are listed. In Table VI.2 reports which attribute the reduction to other causes are given, and in Table VI.3 reports which indicate unabated investment activity (from 1929 on) are shown. No report from which I have any relevant positive or negative information has been excluded.

(ii) All references in my possession which share the belief in a "natural conclusinn", from books, magazines etc, Table VI.4. However other explanations of the fixed investment recession found in such sources are not recorded here; they will be found in the relevant sections of the chapter.

Clearly the evidence, especially that of the agents themselves, is not conclusive. They could be hiding something, or err through ignorance of the total picture. It seems clear eg that for the mass of textile firms

reporting the conclusion of investment programmes in 1928 (see Table IV.1) the devebpment of the inventory cycle was also an important unstated factor. Likewise the Adlerwerke report of 1928/9 and the N.A.G. report of 1930 omit to mention their recent financial difficulties. Still "there is no smoke without fire" and surely the statement for which so many references are tabulated below can be accounted valid subsidiary evidence for the hypothesis of the chapter.

Table VI.1 Company Reports attributing the Reduction in Capital Expenditure to the Conclusion of Investment Programmes

Company	Branch	Year
Baumwollindustrie Erlangen-Bamberg	Textiles	1928
Bremer Wollkämmerei	Textiles	1928
Klöckner A.G. (Hasper Works)	Iron/Steel	1928
Meyer Kauffmann	Textiles	1928
Norddeutsche Wollkämmerei ...	Textiles	1928
Rheinische Metallwaaren und Maschinenfabrik	Mech. Eng.	1928
Schubert und Salzer	Textile Machine	1928
Adlerwerke	Vehicles	1928/9
A.E.G.	Elec. Eng.	1929
F A Hammersen	Textiles	1929
Hoesch*	Iron/Steel	1929
Kali-Chemie A.G.	Chemicals	1929
F Krupp	Iron/Steel	1929
Mannesmann	Iron/Steel	1929
Siemens-Schuckert Werke	Elec. Eng.	1929
Kali-Chemie A.G.	Chemicals	1930
F Krupp	Iron/Steel	1930
N.A.G.	Vehicles	1930
Kuhrstahl A.G.	Iron/Steel	1930
Ver. Oberschlesiche Hüttenwerke	Iron/Steel	1930
Gutehoffnungshütte	Iron/Steel	1931

* This report also contains evidence of other reasons for the reduction.

Table VI.2 Company Reports which attribute the Reduction in Capital Expenditure to Factors other than as in Table IV.1

NOTE: (F) = Financial State of Company
(E) = General Economic Climate

Company	Reason	Branch	Year
Eisenhüttenwerk A.G. Bochum	(E)	Iron/Steel	1929
Harpener Bergbau	(F)	Hard Coal	1928
Buderus Eisenwerke A.G.*	(E)	Iron/Steel	1928
Hoesch	(E)	Iron/Steel	1930

SOURCE: J Ferfer op.cit. p 130.

Table VI.3 Company Reports which report continued Fixed Investment with no sign of Abatement (from 1928/9 only)

Company	Branch	Year
M.A.N.	Eng. Vehicles	1928/9
Ilseder Hutte	Iron/Steel	1929
Klöckner A.G. (ie in general)	Iron/Steel	1929
Mechanische Weberei zu Linden	Textiles	1929
Mitteldeutsche Stahlwerke	Iron/Steel	1929
Preuss. Bergwerks- und Hutten A.G.	Iron/Steel etc	1929
Siemens und Halske	Elec. Eng.	1929
Deutsche Edelstahlwerke	Steel	1930
Eschweiler Bergwerksverein	Hard Coal	1930
Gelsenkirchener Bergbau	Various	1930
Gutehoffnungschütte	Iron/Steel	1930
Ilseder Hutte	Iron/Steel	1930
Röchlingsche Eisen- und Stahlwerke AG	Iron/Steel	1930
Ruhrgas A.G.	Gas	1931
A.G. für Kohlenverwertung	Research	1931

Table VI.4 Other Sources which attribute the Decline in the Rate of Fixed Investment to the Conclusion of Investment Programmes

DBZ 26/8/28 p 1, "Rheinisch-Westfälischer Eisenmarkt". Rationalisation and renewal have come to "some sort of a conclusion". But local authority liquidity crisis also blamed.

Konj.berichte "Westen" 1929 H1 pp 10-11, "Der Konjunkturverlauf 1926-28". Blames investment decline (dated from 2nd quarter 1928) on the completion of a substantial part of the "renewal" (Umstellungsprozess) in the iron/steel industry itself.

Keiser und Benning op.cit. p 43: conclusion of an investment programme in lignite.

Magazin der Wirtschaft 27/12/28 p 1979, "Abklingende Konjunktur": decline due to completion of expansion plans and the like, but aggravated by the deterioration in the supply of funds.

Maschinenbau 1929 7/2/29 p W25 (O Veit), "Konjunkturentwicklung und Kapitalversorgung": 1927 upswing came to an end a) because of a natural conclusion of investment programmes, b) lack of finance.

Sprechsaal 1929 p 549, "Die deutsche Glasindustrie": The transformation of the plate-glass section of the industry was largely completed last year.

E Welter, Stockung ... (1929) p 29: Downswing due to end of Rationalisation boom, also due to lack of funds, overcapacity etc.

A Wirtz: "Die Lage der Eisen- und Stahlindustrie im Jahre 1929" in Jahresberichte der Arbeitsgemeinschaft der Industrie- und Handelskammern der Ruhrbezirk, 1929 pp 71-3: "Investment programme coming to some sort of a conclusion."

APPENDIX VII

A REVISION OF HOFFMANN'S ESTIMATES OF NET VALUE ADDED BY AGRICULTURE

Hoffmann defines net value added by the agricultural sector to relate to the production of the sector as shown in the following Table:

Table VII/1 Hoffmann's Definition of Net Value Added by Agriculture

Crop Yields, Animal Slaughterings etc.		
(i)	minus	(seed grain + feedstuff + loss)
	=	Production
(ii)	minus	necessary inputs (eg fertilisers, fuel)
(iii)	plus	rental value of own dwelling of farm operator
(iv)	plus	net increase in size of livestock
	=	Net Output
(v)	minus	maintenance and depreciation of 'inanimate' capital
(vi)	minus	other necessary costs (eg property taxes, insurance premia)
	±	Net Value Added

SOURCE: Hoffmann ... pp 288-95, 314.

It can readily be shown that his estimates of net value added for the arable section, which he publishes as calendar year estimates, are in reality estimates for the harvest year which commenced during the calendar year in question. His estimates of production can be matched directly with those of his source (D Grupe) as follows:

Table VII.2 Production in the Arable Section

Reference Period :	Grupe	1924/5	1925/6	1926/7	1927/8	etc.
" " :	Hoffmann	1924	1925	1926	1927	
Production of wheat:	Grupe	2126	2963	2204	2806	
" " " :	Hoffmann	2126	2963	2204	2806	

* Production : as defined in Table 2 p above.

SOURCE : D Grupe: Die Nährungsmittelversorgung Deutschlands seit 1925, Teil B p22; Algebraic Sum of the following items: Nettoveränderung, - Einfuhrüberschusse, Verfütterung, Bestandsveränderung.
Hoffmann: op.cit. p 293.

The same seems to hold good in the derivation of net value added in arable from production. Hoffmann derives items (ii), (iii), (v) and (vi) of Table VII/1 (p 444) from Stat.Reichsamt data. Where both employ an identical classification it can be found that Hoffmann has entered under calendar years elements which in the Stat.Reichsamt source appear under harvest years, thus:

Table VII.3 Selected Necessary Costs in the Arable Sector Mill.Mks.

Reference Period:	St.Reichsamt	1925/6	1926/7	1927/8	1928/9
" " :	Hoffmann	1925	1926	1927	1928
Fertilisen Purchases		622	723	690	775
Maintenance of Buildings		328	331	366	360
Maintenance of Machinery		577	619	704	714

SOURCES: Stat.Reichsamt, St.Jb.f.d.dt.R. 1936 p 509.
Hoffmann, op.cit. p 318.

The St.Jb. and Hoffmann classify other categories of necessary costs differently, so that 'switch of period' cannot be directly proved for these; the above evidence seems sufficient however.

To obtain estimates of net value added in agriculture on a 'true' calendar year basis the following rough adjustment procedure is proposed:

a) Regard Hoffmann's estimates of arable production and of 'necessary' costs' as having reference to the harvest year which commenced during the calendar year under which he entered them.

b) Obtain rough calendar year estimates of production in arable by averaging successive pairs of Hoffmann estimates

(eg estimate of arable production 1928 = $\frac{1927/8 + 1928/9}{2}$)

Add these 'calendar year' estimates of arable production to Hoffmann's estimates of livestock and livestock product production, to obtain calendar year estimates of agricultural production as a whole.

c) Apply the averaging procedure just described to the algebraic sum of items (ii), (iii), (v) and (vi) in Table VII.1 p 444 . Combine the calendar year estimates for the sum of these items with Hoffmann's estimate of calendar year change in livestock, and add this total (algebraically) to the agricultural production estimate obtained in b), to get an approximation of net value added during calendar years. The result is shown in Table VII.4

Table VII.4 Revised Estimates of Net Value Added in Agriculture
Mill.Mks. Current Prices

	Production in Arable		Production in Livestock	Production in Livestock Products
1924/25	2891			
1925/26	3288	1925	4510	4153
1926/27	2428	1926	4889	3924
1927/28	3735	1927	4939	4249
1928/29	4583	1928	5425	4519
1929/30	3714	1929	6193	4300
1930/31	2973	1930	5504	3842

	Aggregate Production Hoffmann	Revised	Items (ii), (iii), (v), (vi)*	Change in Livestock Size
1925	11951	11753	-	-
1926	11241	11671	2490	+250
1927	12973	12320	2703	+790
1928	14523	14099	2873	+80
1929	14207	14642	2940	-240
1930	12319	12690	2769	+820

	Net Value Added in Agriculture	
	Hoffmann	Revised
1925	9128	-
1926	8915	9421
1927	10933	10407
1928	11688	11306
1929	11101	11462
1930	10567	10741

SOURCE: Hoffmann pp 313, 316-7.

B I B L I O G R A P H Y

B1 Unprinted Sources
B2 Works of Statistics
B2
B3 Periodicals and Newspapers
B4.1 Germany: Books and Articles (Pre 1945)
B4.2 Germany: Books and Articles (Post 1945)
B5 General and Theoretical Works

B1 UNPRINTED SOURCES (excluding dissertations)

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1274)
2067) Papers concerning the Beratungsstelle
2100) für Auslandskredite
2126-30)

BA R11

1370)
1375) Deutscher Industrie- und Handelstag

BA R13 I (Wirtschaftsgruppen)

45)
70) Verein deutscher Eisen- und
336) Stahlindustrieller
337)

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635 (Reports of the Reichsbank President to the Reich Government)
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656 (Matters relating to Savings and Credit)

BA Nachlass Silverberg (Silverberg Papers)

10, 22, 30, 204, 248, 481, 497, 540, 541

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Konjunkturstatistisches Handbuch. Berlin (Institut für Konjunkturforschung; ed. E Wagemann) 1936.

B2 WORKS OF STATISTICS (cont'd)

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Iron Age, New York (Iron, Steel)

Kölnische Zeitung, Cologne.

Konjunkturberichte 'Westen', Essen.

Magazin der Wirtschaft, Berlin.

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Neue Zürcher Zeitung, Zurich.

Schmollers Jahrbuch, Berlin.

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Sprechsaal, Coburg (Glass and Ceramics).

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